# SPRECKELS

## SUGAR BEET

# BULLETIN

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PUBLISHED FOR CALIFORNIA SUGAR BEET GROWERS BY THE SPRECKELS SUGAR COMPANY

# SPRECKELS SUGAR BEET BULLETIN

VOL. 23 JANUARY-FEBRUARY, 1959 NO. 1

## *PROPER PLANTING*

**of sugar beets contributes much toward securing an adequate pre-thinning stand.**

**SEEDBED PREPARATION**
**SEEDING RATE**
**PLANTING DEPTH**

**are some of the factors which demand close attention. See page 2.**

# PROPER PLANTING PROCEDURE

By JOHN R. McDOUGALL

*Field Superintendent,*
*Spreckels Sugar Company*

THERE ARE MANY makes of planters used for sugar beets, but they can generally be classified into two groups—either flat planting equipment, or bed planting equipment. In most cases, the flat planting equipment is being used less as time progresses, and is now generally used in areas where high water tables make furrow irrigation an impossibility. It is equipped with either disc type openers or shoe type openers, the choice of which usually depends upon the amount of trash or plant residue which has been incorporated into the seed bed. It is usually an assembly of from 4 to 12 planter units of the precision plate type mounted on a wheel carrier. It is often provided with clod pushers in order to place the seed into sufficient moisture for germination.

Unless flat planting has been early enough to take advantage of the rainy season, the heavy rolling and packing of the seed bed to bring moisture to the surface, and the dependable drying north winds of the spring season cause growers to plant too deep. The resulting stands are poor and in many cases should be abandoned. Where rain machines are available and are used, this heavy soil compaction is not necessary; seed can be planted at a shallower depth, and successful stands secured.

## PLANTING ON BEDS

Bed planters are generally of the sled type provided with from 4 to 12 planting units. They also have shoe or disc openers and may be of the precision plate type or random placement type. Ridges or beds are generally formed before planting; however, some sleds are equipped to ridge as well as plant. Many growers have invested several thousands of dollars in multiple-purpose sleds that will ridge, roto-till, shape and plant. Some of these are now being made commercially. But whether the planter cost forty dollars or four thousand dollars; whether it belongs to you, or is borrowed or rented, be sure to check fundamental adjustments. See that you have the right row spacing of your planters; that you have the proper seed plates; and that your shoes or disc depth bands are uniformly at the same desirable depth. Nothing is more disconcerting than when cultivating to find most rows in your field have become "guess rows." There is no end to "cultivator blight" under these conditions, and there is also no such thing as a good close cultivation. Then when harvest time rolls around, you wonder where all the watergrass and weeds came from.

It is also just as disconcerting to find when you have finished planting that a considerable amount of seed is left over when you know for sure you ordered just enough for six pounds to the acre. This will not happen if you check the seed plates before planting, and make a few dry runs to make sure a sufficient amount of seed is being turned out. If every environmental condition were ideal for germination, certainly a pound of seed per acre would be sufficient; but mother nature has not made conditions ideal. A few pounds of extra seed is good insurance against planting failure.

It is again just as disconcerting to check your field after emergence and find every other row with a poor stand. You might curse the weather, the planter, or the seed (and quite often, the fieldman), but in most instances you will find there is no uniformity in the depth of the planter bands or shoes. What might have been only a difference of one-half inch in adjustment of the planter meant death to small beet seedlings and a resulting poor stand that will give nothing but headaches all season.

## FACTORS WHICH INFLUENCE STANDS

Soil type and the texture of the soil previous to planting both strongly influence planting depths. Extremely fine seed beds look beautiful to the eye, but under conditions of heavy rain and north winds become a concrete grave for the young beet crop, especially if planted over an inch in depth. A rough seed bed is much more desirable. It won't run together under adverse weather conditions, will crumble better under rolling, and will absorb more water if irrigation is necessary to moisten the bed. Of course, highly organic soils probably can be planted to a greater depth in that crusting is not so much of a problem. But under most conditions in either the heavy or the lighter, sandier soils, planting to a maximum of one inch should be most successful.

As the planting season progresses, the air and soil temperatures increase. Along with this, the probability of loss of stands due to damping off organisms also increases. There are several types of these organisms, *Phoma* (which is seed borne), *Aphanamyces* (water mold), *Pythium Ultimum*, *Pythium Aphanadermatum* and *Rhizoctonia Solani*. The latter three can be somewhat controlled by seed treatment as well as cultural practice in planting.

Under mild infection, seed treatment will insure a stand, but with spring planting, the infestation is quite heavy due to the high temperature and ample moisture from irrigation. Under these conditions, it is quite necessary to plant very shallow—just deep enough to cover the seed. It may also be necessary to irrigate twice to insure enough moisture for complete germination. These precautions will get the plant above the ground so there would be actually a smaller portion of each plant for the fungus to attach, and thus a shorter period of time to infect it.

Sugar beet seedlings do not have as much strength to force their way to the surface as do other seedlings (such as cotton and most weeds). Thus it becomes increasingly important to avoid planting too deep if an adequate pre-thinning stand is to be insured.

THE COVER photo was taken near Salinas on a hazy afternoon in January — an example of expert seed bed preparation and careful planting procedure as recommended in this article.

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# CHEMICAL WEED CONTROL IS MAKING DEFINITE PROGRESS

By WILLIAM DUCKWORTH
*Field Superintendent*
*Spreckels Sugar Company*

WITH THE DEVELOPMENT of selective herbicides, sugar beet agronomists have made persistent efforts to apply these chemicals in the most practical and economical manner. Innumerable chemicals have been screened in order to find those giving the greatest weed control with the least beet damage. The principal emphasis was placed on the control of weeds in the growing crop. Under these conditions, many promising herbicides were found to be too severe on beets or too erratic in weed control to be generally applicable. Growers, therefore, made only limited use of chemical weed control and continued to rely primarily on the use of costly hand labor.

The difficulties inherent in post-emergence chemical weed control turned the attention of growers and researchers towards a practical method of eliminating the weeds before they emerged. In areas that experienced late rains or used rain machines for germination moisture, pre-emergence chemical applications could be used to good advantage. However, watergrass—the major summer weed in California—did not readily lend itself to this type of control due to the necessity of furrow irrigating for germinations.

## METHODS OF APPLICATION

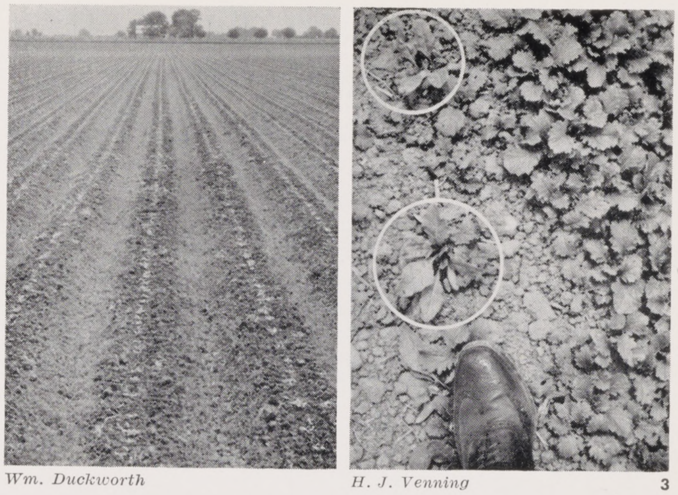
With these problems in mind, growers in the Yuba City area began to experiment with chemical herbicides. Methods of application and chemicals were reevaluated. These growers began to use materials that had been discarded by researchers as not practical under most California conditions. By developing newer methods of application, a major step forward was made in the chemical control of weed pests.

The material was applied in (1) a band spray over the seed row immediately after planting, (2) banded in the dry form down the ridge and mixed with the soil by use of a rotary cultivator, (3) mixed with the soil by spraying at time of listing.

Excellent control has been obtained using all three of these methods of application. But they must be used under the proper conditions. The banded spray applied after planting can only be used prior to rains, or with an overhead irrigation set-up. This method is relatively simple, requiring a minimum of equipment and with adequate rain carries the material to the zone of weed seed germination.

Mechanical mixing of the material with the top few inches of soil has been used with good results. Following forming and rolling of the beds, the material was banded on the surface and a rotary cultivator mulched the chemical into the surface soil. The field was then planted and irrigated in the normal manner.

A variation of the above method of mixing the chemical with the soil has been used for the past two seasons with notable success. It reduces the number of operations and is more readily useable by most Valley growers. It involves the spraying of the material into the bed at the time of listing so that as the bed is formed, the material will be mixed in the soil.



*Wm. Duckworth* *H. J. Venning* 3

**ENDOTHAL—BAND TREATMENT**, sprayed onto ridges as they were listed.
**LEFT**—watergrass is sprouting everywhere except on beet rows.
**RIGHT**—circles indicate beet seedlings on weed-free band; mustard is thriving in untreated furrow.

## MATERIALS USED

Satisfactory field results have been obtained with the use of Sodium TCA and Endothal. Field trials are presently evaluating other new materials that may eventually prove satisfactory. But TCA has been used on a relatively large acreage for the past three seasons.

Endothal, a more recent development, was used on a large acreage during the last crop year. Whereas TCA is effective only against watergrass, Endothal has a wider selectivity and is effective against many broad leaf weeds as well as barley, oats and watergrass. The year 1958 saw large acreages treated with these materials with almost complete weed control obtained in the seed row. TCA is slightly toxic to the young sugar beets; however, the stunting that does occur is rapidly outgrown. Endothal, in the amounts used, has shown no toxicity towards seedling beets. The normal application for Endothal is one gallon per acre (two pounds of the material) applied in a ten inch band and mixed with water in a 9 to 1 ratio. Rate of application does not seem to be critical. Twice normal rate has not demonstrated seedling damage. TCA is applied at a rate of 4 pounds per acre. Most growers have found that 20 gallons of water per acre carried the material well.

Cost of the materials must be taken into consideration when the decision to use a chemical weed killer is made. A normal application of Endothal will be at least three times as expensive as a TCA application; therefore, if watergrass is the only weed present, TCA might be used more advantageously. Endothal, however, would be preferred if control of broadleaf weeds as well as watergrass were necessary.

Pre-emergence weed control offers growers another valuable tool for the more efficient and economical production of beet crops. The recent developments of new and more efficient seed-applied fungicides, the commercial plantings of monogerm hybrid seed and improvements in mechanical thinners plus weed control in the pre-thinning stage should make possible rapid advancements in spring mechanization.

# SPRECKELS AGRICULTURAL STAFF ATTENDS ANNUAL MEETING

THE SPRECKELS SUGAR Company Agricultural Staff met at Bakersfield January 22-24. The occasion was the Annual Agricultural Staff meeting.

The purposes are to exchange ideas, to present the latest developments in agricultural research, and to hear from qualified experts in the field of sugar beet agriculture. Agricultural authorities who addressed the meeting were:

Dr. C. W. Bennett, USDA Sugar Plant Experiment Station, Salinas.

V. C. Burton, Farm Advisor, Kern County.

G. V. Ferry, Farm Advisor, Kern County.

Jerry Ladd, Kern County Land Company.

Dr. G. F. McLeod, Sunland Industries, Fresno.

J. T. Moody, State ASC Office.

L. A. Moody, Arthur Anderson and Company.

M. G. Raney, Kern County Land Company.

Ward C. Waterman, Waterman-Loomis Co., Bakersfield.

L. A. Moody J. T. Moody Dr. C. W. Bennett

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# IMPROVEMENTS IN SPRECKELS' CONSUMER PACKAGE DESIGNS

ADDING TO THE sales power of Spreckels sugar packaging design are several refinements recently created by Walter Landor and Associates, the industrial designers who made a major redesign of the company's consumer packages three years ago. Re-

G. V. Ferry V. C. Burton Jerry Ladd

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M. C. Raney W. C. Waterman Dr. G. F. McLeod

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THE STAFF hears Tom Ryan, District Engineer, discuss receiving station management.

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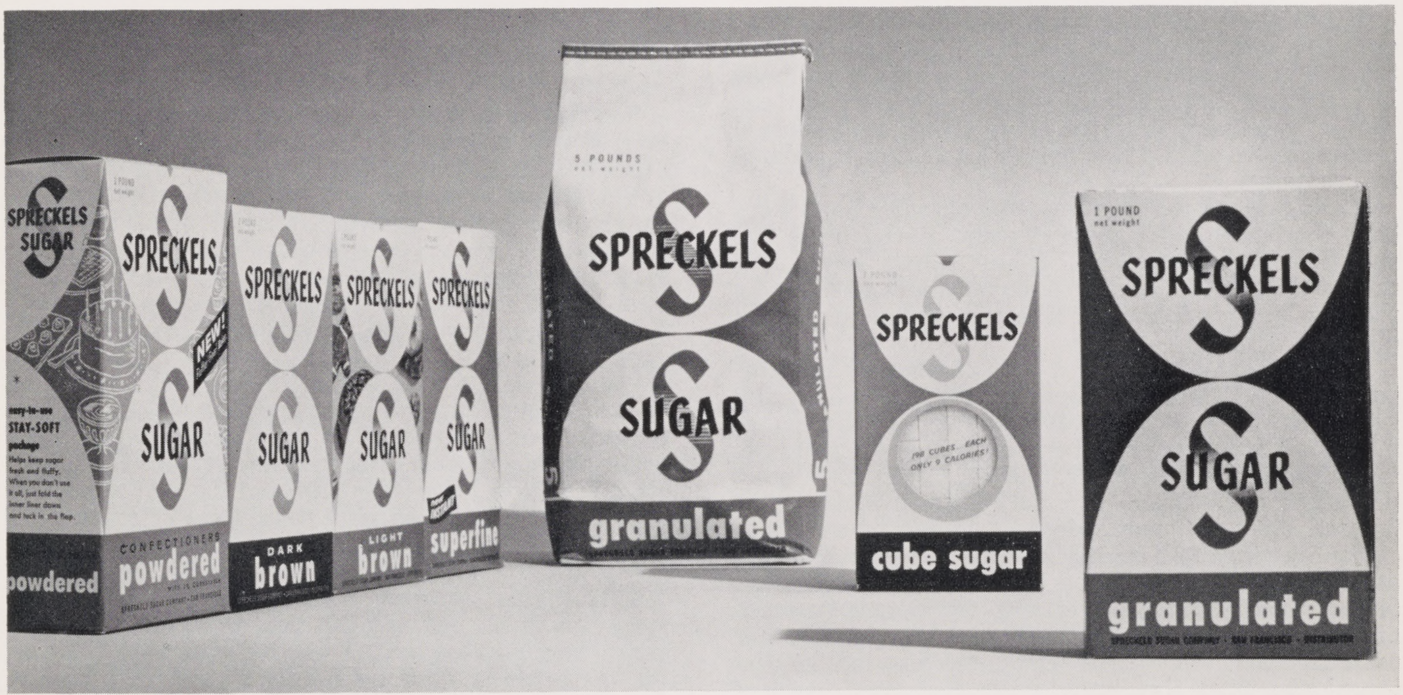
sulting from careful marketing studies, the present design innovations include: (1) a much broader curve of white on the granulated sugar bag (center) and the lowering of the position of the brand name to assure legibility even when the top of the bag is tucked under; (2) a new cube sugar package (second from right) of vertical design for better grocery-shelf stocking and with new color styling to strengthen its resemblance to the other consumer packages; and (3) the extension of the basic design to the one-pound granulated carton (extreme right).

The company's consumer sugars are supported by year-round advertising in Sunset and Everywoman's Family Circle magazines, on radio and in newspapers, by promotions in retail food markets—and by the efforts of Spreckels employees and beet growers to insist on Spreckels Sugar at their markets.



*Jeanne Riemer Photo*

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## 4-H CLUB BEET GROWERS COMPLETE SECOND SUCCESSFUL YEAR

THE 4-H CLUB members and leaders in San Joaquin County recently completed harvesting the beets from their Club's Sugar Beet Project. This marks the second year in which San Joaquin County's 4-H'ers have led the way in this new concept in 4-H Club programs. This year thirty-one 4-H Club members carried on this work in San Joaquin County.

These members and their parents, along with Sprec-

*(Continued on Page 8)*

*S. L. Stovall Photos*

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**RICHARD PAULSEN (left), and Sheldon Teranashi, prove that little boys can grow big beets.**

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**MARY DUE and MONTY McFALL, both of Atlanta 4-H Club were top producers. Mary's plot yielded 9,260 pounds of sugar per acre; Monty's yielded 10,454 pounds of sugar per acre.**

# A STUDY OF FACTORS AFFECTING SUGAR CONTENT IN SUGAR BEETS

By R. T. JOHNSON
*Director of Agricultural Research*
*Spreckels Sugar Company*

THE VALUE OF A SUGAR beet crop is determined by both the tonnage and sucrose content of the beets produced. This is a different situation than is found in many crops in which the value is dependent only upon the quantity produced. During the past twenty-five years, tremendous strides have been made in increasing the yields of sugar beets in California. The average yield of sugar beets grown in California is now almost double the yield of beets grown twenty-five years ago.

During the time that the yields of sugar beets have been increasing, the sugar content in the beets has shown a gradual decline. Many things have been shown to affect the sugar content of the beets. Among those most prominent are nitrogen, temperature and disease.

It has been demonstrated several times that nitrogen is one of the most important factors influencing sugar content of sugar beets. As long as nitrogen is in plentiful supply, the beet is unable to store its maximum amount of sugar, but will continue to grow if disease or moisture are not limiting factors. As pointed out previously, nitrogen is one of the main reasons for the increase in yield that has been achieved during the past twenty-five years. However, the lack of continued yield increases with increasing amounts of fertilizer in recent years in some areas, together with the declining sugar contents, has led to the speculation that possibly a point had been reached in fertilizer application at which increased yields were not achieved and actually the sugar contents were being decreased because of it. The ideal situation for the growth of the sugar beet crop, with regard to nitrogen fertilization, would be to have adequate nitrogen available during the growing season until about a month or six weeks prior to harvest at which time the crop should become deficient in nitrogen and because of this, increase in sugar content would occur.

It has been shown that as temperatures decrease, the sugar content of beets increases, and, conversely, as the temperature increases, there is a decline in sugar content, providing other factors remain constant. This is advantageous to those areas where low temperatures prevail just prior to and during harvest, but under most California conditions, beet harvest is taking place during some of the warmest weather of the year. The temperatures most conducive to sugar content in sugar beets usually occur during the winter when the ground is so wet that growers are unable to harvest. For this reason it would seem that a more reasonable approach to the problem would be in one of the factors over which we can exercise more control, than is possible with temperatures.

Studies have indicated that diseases can affect the sugar content in any one or combination of three ways. They can damage a portion of the plant and in that way, reduce the area capable of photosynthesis and the manufacture of sugars in the plant. They can interfere with the conductive tissues in the plant and, therefore, hamper the translocation of materials within the plant. They generally increase the metabolism rate of the plants and in this manner the plant uses more of the sugar it has manufactured to carry on its life processes. To combat the damage of diseases in sugar beets, resistance, in case of those diseases where inherent resistance is known to exist, is being incorporated into varieties as rapidly as possible. In addition, different seed, soil and plant treatments are being studied in an attempt to control or prevent damage by disease to the beet crop.

## WHAT HAPPENED IN 1958?

The sugar content of the 1958 sugar beet crop started out to be the lowest in the history of the Spreckels Sugar Company. To attempt to assess some of the reasons for these low sugars a survey of fields throughout the beet growing areas served by Spreckels was devised. The scheme of this survey was to choose fields that represented high sugars and low sugars and then compare as many characteristics as could be obtained to see which were most closely associated with sugar content.

Table 1 shows the results of part of this sampling study in District 1, which comprises Monterey, San Benito, Santa Cruz and Santa Clara counties. The fields shown in this study were divided into three groups on the basis of sugar content and shown as high, medium and low with average sugar contents of 16.3, 14.5, and 12.5, respectively. In this case, the group of fields having the highest sugar content also has the highest tonnage. The medium group had the lowest tonnage, but because two of the fields in this group were planted late, it was believed that this was the main reason for the reduced yield rather than any direct relationship between the medium sugar content and low sugar.

**Table 1. Results of a Sugar Beet Field Sampling Study in District 1 (Salinas area)**

| Class | Average Sucrose Content | Beets Tons/Ac. | Nitrate Nitrogen in Petioles | Nitrogen applied in 1958 | Nitrogen applied Past 4 yrs. |
|---|---|---|---|---|---|
| | | | PPM | Pounds | Pounds |
| High | 16.3% | 27.44 | 240 | 170 | 277 |
| Medium | 14.5% | 22.56 | 723 | 158 | 375 |
| Low | 12.5% | 25.04 | 2733 | 154 | 400 |

The nitrogen study in this survey is probably the most revealing portion of the entire table. As can be seen from the table, the nitrate nitrogen found in the petioles at harvest time varied from 240 parts per million in the high sugar group to 2733 in the low sugar group and the medium group with 723. This is indeed a field scale demonstration of the effect of nitrogen at harvest time on the sugar content of beets.

The amount of nitrogen applied during the 1958 crop is not sufficiently different between the groups to explain the differences found at harvest time, since only sixteen pounds of N separates the high group from the low group. The amount of nitrogen applied to these fields during the four years previous to the 1958 sugar beet crop, however, does show a trend toward increasing amounts of nitrogen contributing to decreasing sugars.

The fields used in this survey were considered to be representative of the farms in the coastal area, some of them being fields on which intensive vegetable production had been practiced for many years, and some of which only recently had been brought into cultivation from native vegetation. The lack of relationship between sugar content and yield is interesting in this survey. With an average yield of over twenty-seven tons per acre of sugar beets, it is obvious that the fields in the high sugar group (240 ppm nitrogen at harvest) had not been deficient very long, or the yields would probably have been lower. It is also quite probable that if the fields in the medium group had been harvested a month later than they were, after becoming more deficient in nitrogen, or after having been deficient for a longer period of time, the sugar contents of those fields would probably have approached the average of the high group.

It would appear from these studies that, in some cases, at least, a point had been reached at which some of the fertilizer applied to sugar beets was not contributing to increasing yields, and in addition, was actually causing a decrease in sugar content. This, then, is a twofold loss; the cost of the unused fertilizer plus the reduction in value of the crop due to the lower sugar content of the beets.

The solution of the problem is not simple. Growers have often tried to reduce the amount of fertilizer they have applied to sugar beets and found that it made no great difference in the sugar content. The results of this study would indicate the same thing within narrow limits, because it showed that there was very little difference in the amount of nitrogen applied directly to the fields with high sugar and those with low sugar. The problem of decreasing sugars is not one that has descended upon us in one year, but over a period of many years, and it would seem reasonable that we will not get out of the problem in one year, but the solution will require several years.

## CAN WE TEST FOR NITROGEN?

If some rapid soil test were available that would indicate the amount of nitrogen that would be released in the soil during the growing season, it would then be a simple matter to determine the additional amount required to provide the crop with sufficient nitrogen and still not have an oversupply at the end of the growing season. Unfortunately, no such test is available that can be applied over a large area. Studies are being conducted in an attempt to find such a method that would have practical value.

Fertilizer tests have some value, but the results have limited application. Results from a fertilizer test only indicate the most desirable level of nitrogen for the crop on which the test was conducted. These results may not apply to different soil types, they may not apply to land having different rotations or they may not even apply to the same piece of land the next time it is used for sugar beet production.

An example of the limited application that can be made of results from fertilizer trials may be cited from our studies on our Spreckels Experimental Farm. During the past eight years in which we have been studying this problem, we have failed to demonstrate the value of any nitrogen application to beets on this particular farm. This farm is typical of many of the farms in the Salinas Valley, because the rotations used are primarily intensive vegetable crop rotations in which far more nitrogen is generally applied than is removed in the harvest of the crop. These results have not been widely publicized, because not far away from this farm beet fields were growing where border effects of nitrogen were readily apparent and skips made by fertilizer applicators were conspicuous. Both of these conditions are indicative that nitrogen was not in great oversupply. However, border effects and the obvious strips where there were fertilizer skips are becoming more and more infrequent. This would seem to indicate a generally increasing supply of nitrogen available in the beet fields.

Plant tissue analysis may be of benefit in some cases, particularly in determining if problem fields have an adequate supply of nitrogen. Often when a field begins to appear anything but healthy, the first impulse is to add some more fertilizer. Tissue analysis can readily determine if additional fertilizer is required or if the cause of the problem must be found elsewhere. The limitation of tissue analysis is that, while it gives an indication of the nutrient status of the plant at the time the sample was taken, it does not indicate how long the plant will maintain the status it has at the time nor how much additional fertilizer is required to complete its growth.

Fertilizer practices are often a matter of habit. Generally, the amount applied is about the amount that has given a satisfactory crop in the past. It may be that some growers have tried increased amounts and, failing to get any increased yields, have dropped back to former application rates. Some also have reduced the amount previously applied and, failing to get an increased sugar content, have often gone back to the previous application rates. Because of the great variation of conditions under which sugar beets are grown, the amount of fertilizer used is largely dependent upon the individual farm on which the beets are to be grown.

## PRACTICAL SUGGESTIONS

We have suggested on several occasions and still believe it to be a good idea for growers to attempt simple demonstrations for themselves to help evaluate the fertilizer needs of their particular farms. These need not be complicated fertilizer tests, but simple strips. If fertilizer is applied by a ground applicator, the amount being used could be applied to most of the field but in some area, a skip of a few beds should be left and near to it a lap, or double application on a few beds should be made. This arrangement would give a simple demonstration of the value of three rates of fertilizer. If there is an obvious difference in the foliage of the normal application and that of the skip, it is probable that the addition was required. If the double application appeared better than the normal rate, it is possible that the fertilizer requirements were higher than was actually applied to most of the field. If, however, there appeared no difference in any of the three

*(Continued on Next Page)*

rates, it is likely that more fertilizer was applied than was needed, and consequently the cost of producing the crop was higher than necessary. The research staff of Spreckels Sugar Company would be happy to assist in the yield evaluation and sugar determinations of such comparisons if such help is desired.

Such comparisons will not automatically increase the sugar content of sugar beets but they should help growers to better understand the fertilizer needs of their farms and base future fertilizer applications more on need and less on habit.

It would be obvious folly to assume that all of our low sugar problems are due to the application of nitrogen. Our survey in other areas of the state has indicated that several other things have a very pronounced influence on sugar content and a subsequent article will deal with some of the other factors.

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## 4H CLUB

*(Continued from Page 5)*

kels Sugar Company field men who were engaged in the activity, met at the Manteca factory after the harvest to review their year's results. While there, they were taken on a tour of the sugar factory and were guests of Spreckels at a picnic luncheon.

This program is divided into first and second year garden-type plots and into commercial sugar beet production for the older, more advanced Club members.

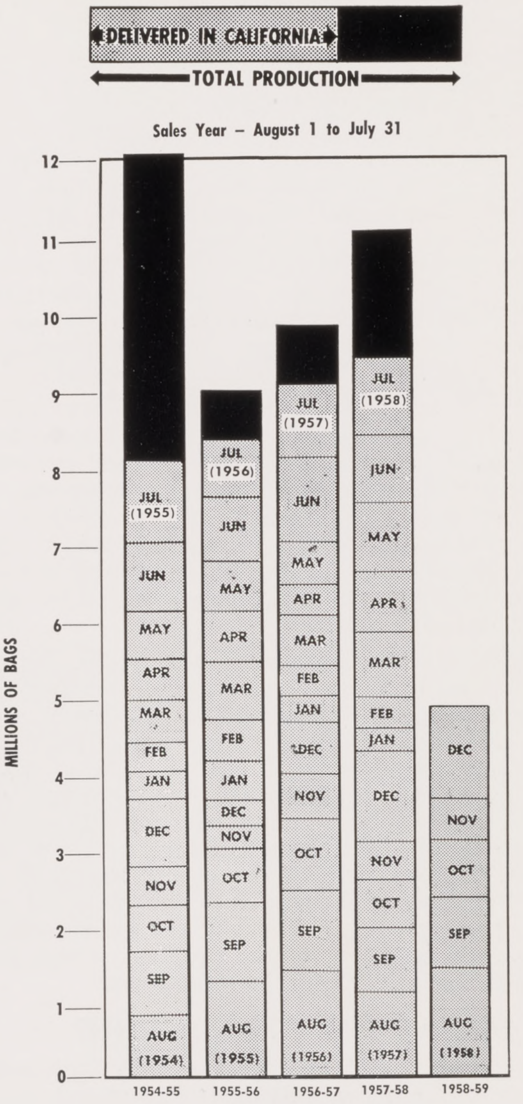
Monty McFall of the Atlanta 4-H Club topped all members with the production of 10,454 pounds of sugar per acre for those carrying on first-year projects. His beets averaged better than 32 tons per acre with a sugar of 15.9 percent. Second to Monty was Mary Due also from the Atlanta 4-H Club, the only girl in the program. Her beets produced 9,260 pounds of sugar per acre and yielded over 36 tons of beets at 14.2 percent sugar.

The second-year project involves a simple fertilizer plot where no nitrogen, 100 pounds of nitrogen, and 200 pounds of nitrogen per acre were applied. In the second-year program, Dave Mettler of Harmony Grove 4-H Club had the top sugar per acre in his plot, which produced 10,737 pounds of sugar per acre and 42 tons of beets. This yield came from Dave's plot on which no fertilizer was applied. The second highest in production went to Dave's brother, Roger Mettler.

In addition to these first and second-year projects, 4-H Club members grew commercial acreages of beets as part of their 4-H Club work. Most of these commercial acreages were grown by youngsters who had had the experience of growing beets under the plot-size projects. There were eleven such projects last season.

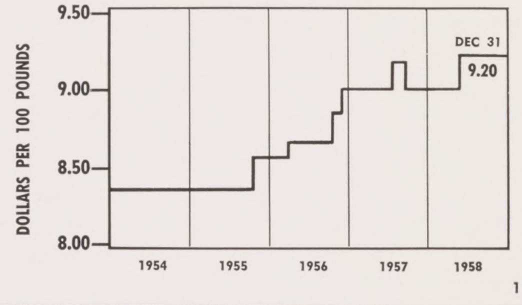
The Farm Advisors and 4-H Club leaders in San Joaquin County are to be congratulated for their efforts in developing this program which holds promise of becoming an important part of 4-H Club activities.

### PRODUCTION AND DELIVERIES OF BEET SUGAR IN CALIFORNIA



### QUOTED PRICE OF BEET GRANULATED SUGAR

In 100 Lb. Paper Bags, F.O.B. San Francisco



The SPRECKELS SUGAR BEET BULLETIN is issued bi-monthly by the Agricultural Department of the Spreckels Sugar Company as a service to its growers.
Mention of specific methods, devices and implements does not constitute an endorsement by the Company.
All photographs by the editor unless otherwise indicated.
AUSTIN ARMER, EDITOR SPRECKELS SUGAR COMPANY WOODLAND, CALIFORNIA

Apr 6 '59

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# SPRECKELS SUGAR BEET BULLETIN

VOL. 23 MARCH—APRIL, 1959 NO. 2

12

## SUGAR BEETS IN CALIFORNIA

Adapt well to the state's climate. So well, in fact, that planting, thinning and harvesting all occupy the spring months.

These are the months of heavy demands for field labor in all crops — a compelling reason to mechanize sugar beet thinning.

# SOME EXPERIENCES WITH MACHINE THINNING IN 1958

*Following is a reprint of a paper presented at a meeting of sugar beet technologists at Santa Barbara. The paper was written and presented by Dan Dieter, Agricultural Superintendent, Spreckels Sugar Company.*

I AM GLAD that I was not called upon to make a report on mechanical stand reduction until this year, because prior to this year there would have been very little to report.

Mechanical thinning did not seem to take hold in most of the Spreckels districts during past years. In spite of the urging and encouragement by Spreckels representatives, a majority of the growers did not seem interested in developing a mechanical thinning program. Prior to 1958 less than one per cent of our acreage was thinned mechanically.

The reluctance on the part of growers can probably be contributed to several factors.

Factor 1 which is probably the most important, is that up until 1958, growers were able to get thinning labor in time to accomplish the job. Even though growers were forced to pay twice and even three times as much for the hand job as was necessary, they seemed satisfied to do so because they felt the extra quality of hand thinning justified the difference in expense.

Factor 2 seemed to be that most thinners then on the market were ineffective because of the heavier type soils more or less prevalent in most of our districts. The early Dixie and Silver thinners were just not rugged enough to do the job in the heavier soils. Occasionally in some of the lighter soils these machines were used and a more or less satisfactory job was accomplished by some of the more courageous growers.

Factor 3 is the idea that yield is reduced by the presence of double or multiple beets. The long-standing belief that all beets must be thinned to singles has been proved wrong. Experimental work to prove that many doubles and a few multiples have no effect on yield has been supported by several years of large-scale field experience. The fact that double beets and a few clumps have no depressing effect on yield has not readily been accepted by most growers—especially those whose attitude was one of "let well enough alone."

## 1958 WAS DIFFERENT

But the story changed substantially in the spring of 1958. The late rains which caused later plantings brought beets to a thinning stage at a time when practically every other crop was competing for labor. The result was that many growers were forced to adopt mechanical stand reduction, either as a complete program, or at least in part to supplement the hand crews that were too small in numbers to get over the ground in time to save the beet stands. Another encouraging factor was the introduction of the Eversman P.T.O. driven thinner. This machine has proved to be rugged enough to work in the heavier soils and versatile enough with its adjustable thinning heads to accomplish the job under practically any conditions. Another factor which has made it a favorite with growers is its versatility in thinning other crops such as tomatoes, cotton and even alfalfa seed stands.

This peculiar combination of bad weather and improved machinery has aided considerably in advancing mechanical stand reduction with our growers. As a result we had over 1700 acres thinned by mechanical means in 1958. These fields were located from Kern Co. to Colusa Co. and in every case the story was the same; growers saved anywhere from a few dollars to $30 per acre with no decrease in tonnage of beets delivered. In fact in many cases an increase in tonnage and sugar content has resulted. Without any doubt, I feel that the next two or three years will see quite an increase in the number of acres being mechanically thinned.

## AN EXAMPLE

One of the most outstanding examples of the possibilities of mechanical stand reduction took place in the Mendota area last spring. This demonstration definitely proved that when a grower and company representatives are determined to make a success of mechanical stand reduction, it can certainly be done.

This grower had 350 acres of beets that had been planted early in December and January just prior to the start of the long rainy spring period. It was the first of April before this man could even start to cultivate his stand. The continued spring rains had compacted the top 3 or 4 inches of the heavy clay soil until it had the tilth of a concrete sidewalk. The beets had grown to where the roots were from ¾″ in diameter down to the size of a lead pencil and the tops were 12″ to 14″ high. To make matters doubly worse, there was a scattered stand of volunteer barley throughout the fields. Under normal conditions a wise and prudent grower would have disked up the stand and replanted. However, the landlord was opposed to such action. The grower immediately started the usual cultivation and hand thinning program which he had been following in previous years. Thirty acres of beets were thinned at a cost of $55 per acre. It soon became quite obvious that, even if the grower could have survived the $55 thinning, his crop would be lost because of the slowness of the hand crew. It took a crew of 50 people almost three days to complete the 30 acres. The hard soil, the large beets, and the volunteer barley just were too much for the crew to make any speed. The grower purchased an Eversman thinner and then asked the Agricultural Department of the Manteca office for help in making it work. On April 10th the field force of the Manteca district arrived at the field, to make mechanical stand reduction a success. To make a long story short, after nearly a full day testing knife settings, various cultivator setups and anything else that any of the group thought might improve the situation, a satisfactory stand reduction was accomplished. Here is what it took to do the job.

1. A cotton stalk cutter preceding the thinner. (This was necessary because of the top growth clogging the knives. Also because of the volunteer barley.)
2. Once over with the Eversman thinner with a knife setting of alternate #3 and #5.

3. Two cultivations after the thinning. (Necessary because the ground was so compacted.)

4. Two times over with long handled hoes.

On the first trip, the hoeing crew removed the remaining weeds and broke down any strips or clumps of beets that the thinner missed. No finger thinning was done at all. The second trip was for removal of weeds only.

The total cost of this operation including the operation of the stalk cutter, cultivation and hoeings was $23 per acre. This was a saving of $32 in cost, plus the fact that mechanical thinning was the factor that actually saved this acreage of beets. NOW—let's look at the comparative yields . . .

Hand thinned acreage—18.6 tons, 14.2% sugar.

Mechanical thinned acreage — 22.3 tons, 14.4% sugar.

We had numerous other cases up and down the district of $12 to $25 per acre saving, plus corresponding increases in tonnage. But the example mentioned was the most outstanding because it contained about the most difficult set of conditions possible for a grower to face. It clearly showed that when the people involved are determined, mechanical stand reduction will work even in the face of supposedly unsurmountable circumstances. This fact was hammered home to everyone in Spreckels Sugar Company who worked on the trial last April 10th.

### OTHER EXPERIENCES

I would like to summarize here some of the comments on machine thinning by the Spreckels Field staff.

1. Beets should be in 8 to 10 leaf stage before thinner is used.
2. Have crew immediately behind thinner for best results. Beets and weeds are lying flat on ground at this stage and workers have better view and can do faster job of hoeing.
3. Beets that get too heavy a top growth can be topped with stalk cutter to better adjust cutting depth.
4. Precision planters or planters with disk openers tend to give better results because of narrow seedling row.
5. *Any* stand of beets can be reduced satisfactorily if the grower will take the time and effort necessary to get correct adjustment of thinner.
6. The P.T.O. driven thinner with adjustable heads is far superior to the trailed thinner with interchangeable heads or knives.

Following is a summary of costs which demonstrates the saving enjoyed by two growers who used mechanical thinning:

GROWER 1.

| | |
|---|---|
| Hand thinned Costs | $30. per acre. |
| Machine Thinned Costs | $12. per acre. |

Job consisted of once over with machine and long handled hoes.

Eversman thinner used.

GROWER 2.

10 acres hand thinned at $51.00.

53 acres thinned "once over" with Eversman. Cost of hand labor after thinner was $23.50 per acre. Long handled hoes used.

(*Continued on Page 16*)

## MORE MECHANICAL THINNING IN 1959

*By* AUSTIN ARMER

*Agricultural Engineer, Spreckels Sugar Company*

CALIFORNIA BEET GROWERS are thinning more sugar beets by machine this year than ever before. It has taken mechanical thinning a long time to catch on in California, and there are plenty of good reasons. In the past, labor has been plentiful during the early spring months, and in spite of repeated warnings of labor shortages, there has in the past been a more or less adequate thinning labor supply during the early spring.

Now, however, growers are turning to mechanical thinning, not entirely because of the threat of labor shortage, but also because there has been abundant evidence that mechanical thinning is satisfactory in quality and superior in economy.

### THE GROWER'S RESPONSIBILITY

The success or failure of any new cultural procedure is pretty well dependent upon the attitude of the grower who is making the change. Observations would indicate that wherever mechanical thinning has given mediocre or unsatisfactory results, someone was at fault. Most of the cases where mechanical thinning did not prove satisfactory reveal that a farmer hastily decided to try mechanical thinning—a decision which was not based on any well-laid plans. Such a decision might have been the result of inability to secure a labor supply, and then discovering that the beets had grown so big or weedy that no thinning contractor would take the job.

This is a typical story. Failure of the program was predestined when the grower who decided to use mechanical thinning failed to follow through the entire procedure. The responsibility passed from one person to another, always from a more responsible to a less responsible individual. The result is, of course, failure because the man finally responsible for the work in the field was totally unable, through ability or experience, to make the thinning machine work.

Now let us examine a typical successful mechanical thinning experience. The beet grower personally made his decision to use mechanical thinning at a date well ahead of thinning time. He personally watched the growth of his beet stand and when it became evident that an adequate stand for mechanical thinning was in prospect, he saw to it that the machine was ready and in operating condition. Next, he made many stand counts in the field to assure himself that the machine would leave an adequate stand. Then when the beets were the right size, he put the machine in the hands of a competant and well instructed operator and stood by long enough to make certain that the operator was doing the right kind of job.

### MACHINES AVAILABLE

This year there are two makes of thinning machines which are available to California growers. Others are in process of development, but it would be premature to announce them at this time.

The two machines offered are Eversman and Silver. The Eversman made its debut in California last year and found immediate and wide-spread acceptance. Details of the Eversman machine were described in the March-April 1958 issue of the Spreckels Sugar Beet Bulletin. The machine remains unchanged this year, and is available in four or six row, tool-bar mounted units. It should be pointed out that the Eversman construction does not permit spacing adjacent cutters close enough together to handle two rows on the top of double row beds. However, where beets are planted on two-row beds, the machine works satisfactorily by setting the cutter heads on forty inch centers and making two passes by driving the tractor back a second time over its original tracks.

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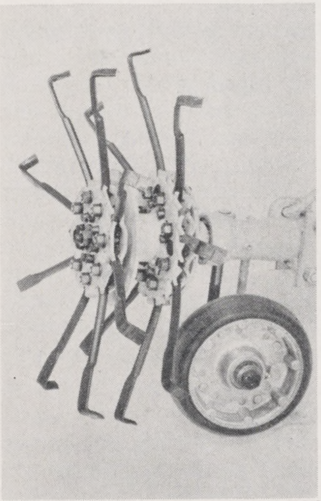
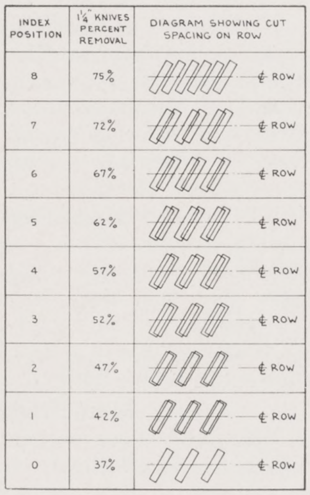
**THE EVERSMAN** thinner is adjustable for row-spacings from 18" to 30". But 2-row beds, with 12" to 16" spacing on top of the beds, can be accommodated by setting the cutters on 40" spacing, and making two passes over the field (the tractor returns in its original tracks, but in the opposite direction).

The Silver Thinner as manufactured since last year is a tool bar mounted machine which may be driven either by power take-off or from the tractor rear axle. However, this year Silver Engineering Works offers a very important innovation in the form of an adjustable tandem cutter head. In general appearance identical with last year's tandem cutter head, it bears the important difference that the angular relation between the two heads is adjustable, with the result that stand reduction from 37% to 75% becomes possible by merely resetting the angle between the two heads. Thus the most serious inconvenience of the Silver Thinner—changing heads or knives—has been eliminated.



*Silver Eng. Wks.* 14



| INDEX POSITION | 1¼" KNIVES PERCENT REMOVAL | DIAGRAM SHOWING CUT SPACING ON ROW |
|---|---|---|
| 8 | 75% | ℄ ROW |
| 7 | 72% | ℄ ROW |
| 6 | 67% | ℄ ROW |
| 5 | 62% | ℄ ROW |
| 4 | 57% | ℄ ROW |
| 3 | 52% | ℄ ROW |
| 2 | 47% | ℄ ROW |
| 1 | 42% | ℄ ROW |
| 0 | 37% | ℄ ROW |

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**THE NEW SILVER** adjustable tandem cutter head (Silver part number 1-12531) fits existing Silver thinning machines.

It is instantly adjustable in the field to remove from 37% to 75% of the stand, as shown in the diagram on the right.

Another valuable item offered by Silver Engineering Works is a conversion kit with which the trailed thinner offered from 1950 to 1957 may be converted to a rear tool-bar mounted machine. The conversion kits for trail thinners made in 1952 and later is Silver part No. 1-10590. For machines made in 1951, the conversion kit number is 3-10590. It should also be noted that the new tandem cutter head may be installed on existing machines.

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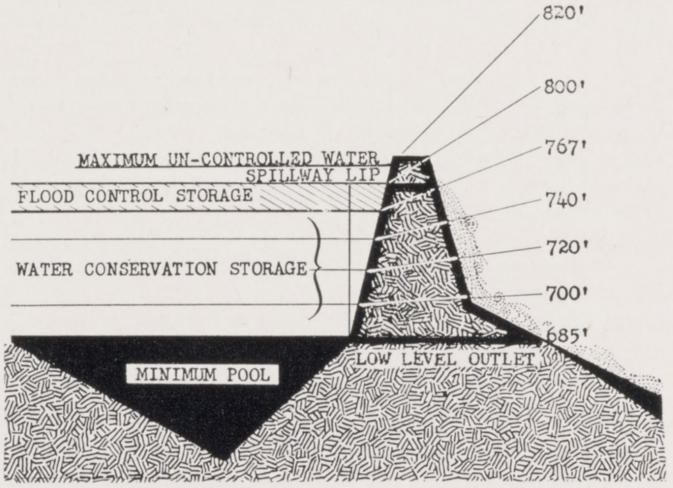
# BENEFITS OF NACIMIENTO DAM

IN 1955 THE VOTERS of the Monterey County Flood Control and Water Conservation District made possible the construction of a 7 million dollar dam on the main tributary of the Salinas River—The Nacimiento River. The wisdom displayed by the voters in 1955 becomes more evident every year. Loran Bunte, Jr., Monterey County water engineer, announced that well readings taken last fall throughout the Salinas Valley demonstrate that the water table has risen an average of 5.6 feet since similar samplings were taken in 1957. This is in sharp contrast to the situation as it existed before the dam was built—when an estimated annual overdraft of 27,000 acre feet was causing the water level in Salinas Valley wells to drop more and more every year.

## WATER MANAGEMENT

The benefits of a flood control and water conservation dam do not come about automatically when the

(Continued on Page 15)



*King City Rustler Herald* 16

**WHEN THE DAM** is full and spilling over (800 ft. above sea level), it impounds 360,000 acre feet of water.

From the level at 767 ft., down to the low level outlet at 685 ft., there is 200,000 acre feet of water conservation storage.

The top 33 feet of water depth represents 160,000 acre feet of flood control storage.

# FURTHER STUDIES OF THE FACTORS AFFECTING SUGAR CONTENT

*By* LAUREN BURTCH
*Agronomist, Spreckels Sugar Company*

IN THE LAST issue of the Spreckels Sugar Beet Bulletin, Dr. Johnson discussed the influence of nitrogen, both accumulated and applied, on the sugar content and quality of California sugar beets in recent years. Climate and disease were mentioned as additional factors in our declining sugar contents. This article is a continuation of Dr. Johnson's discussion and will cover the climatic, disease and variety influences on sugar contents.

## WEATHER

One of the principal factors affecting sugar beet yields and qualities in California is weather. Yet weather is the one factor least often credited for our good or bad crop years in this state. The reason for this is obvious—we can't control weather. But we must still consider climatic and weather influences in order to understand and fully appreciate our problems.

Here in California, we have had two successive poor weather years—1957 and 1958. The 1957 crop, while setting a state tonnage record, produced the lowest sugar content on record. The reason for this is largely weather, although other factors, especially nitrogen and disease, were certainly involved. In California, evaporation tends to accumulate salts on the soil surface during the hot dry summers. Among these salts are nitrates which have originated from applied nitrogen. In September and October of 1957, we experienced unusually heavy rains followed by unusually warm temperatures. The rain in many fields leached nitrates from the soil surface back into the beet root zones and the warm temperatures plus high moisture and fertility encouraged an unusually heavy fall tonnage increase. This same combination resulted in low sugars because we failed to have a suitable conditioning period for sucrose accumulation. The mean temperature for the two-week period preceding harvest had a direct bearing on sugar content (Fig. 1.)

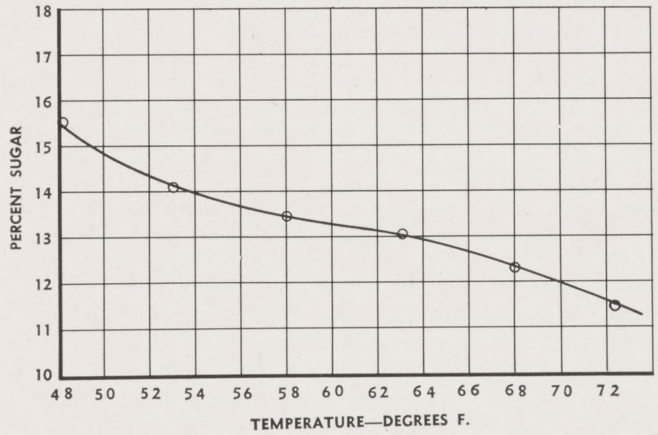


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Fig. 1. MEAN TEMPERATURE during the 14 days preceding harvest has an important effect on sugar content. Cool harvest weather means high sugar—hot harvest weather means low sugar.

In 1958, the extremely wet spring caused unusually late plantings with poor stands resulting from disease and insect infestations. On top of this, several unseasonal showers blanketed the state in mid-summer. These showers were followed by high humidity periods; and a heavy infestation of *Cercospora* leaf spot resulted on early beets that were sandwiched in between winter and spring rains. Fortunately, we were blessed with a long cool dry fall. Sugar content rose markedly as the harvest season progressed in the Central Valley area. Mr. Manuel pointed this out in the November-December issue of the Spreckels Bulletin.

I realize that this seems to have been a rather long and elementary discussion of a factor over which we presume to have no control—weather. But this is true only to a degree. It is within our power to minimize weather-induced factors. One of the most important of these is to follow proper planting procedures for each particular season so as to secure the best possible emergence stand of beets. New fungicides are being studied by Dr. L. D. Leach at the University of California which should help stand emergence, but we must remember that crop rotations in recent years are increasing our emergence problem. We are growing crops such as tomatoes, cotton and sugar beets more frequently in the rotations, and we are fertilizing all crops more heavily than ever before thus tending to produce and incorporate more disease bearing crop residues into the soil. Therefore proper planting procedures, especially procedures which help speed seedling emergence, are more important.

Proper planting procedures and good stands will help in the problem of excessive nitrogen at harvest. Many growers, for example, reduced nitrogen applications in 1958 somewhat but still failed to improve sugars because of poor stands, a short growing season and disease. Nitrogen applications have been shown to help minimize problems such as *Sclerotium rolfsii*, nematodes, and curly top. High nitrogen rates, however, are not beneficial to any beet crop at harvest, and actually seem to accentuate the adverse affects of diseases such as leaf spot, virus yellows and root rots (Fig. 2).

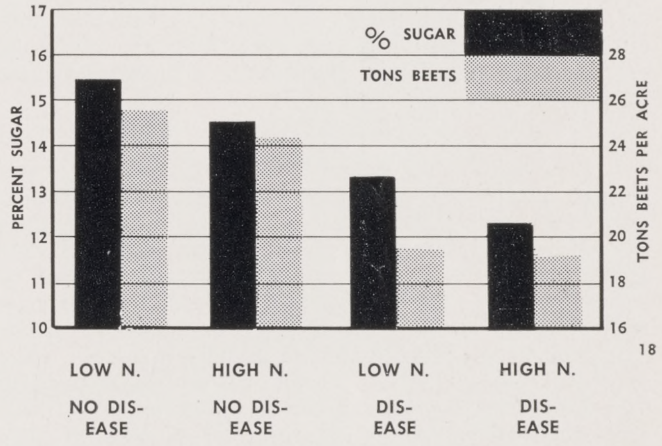

Fig. 2. DISEASE was a major factor in depressing both yield and sugar content in 1958.

PETIOLE NITROGEN at harvest time was also a factor — the higher yields and sugar contents were associated with low nitrogen at harvest time.

## DISEASE

Fig. 2 shows data from 42 fields which were included in the quality survey program last fall. These fields were divided into two categories for the presence of disease as a factor and two categories for nitrogen content at harvest. This grouping shows, as we would expect, that our highest yields (25.6 tons) and sugar contents (15.4%) were obtained from fields having no disease and a low nitrogen content at harvest. Our lowest sugars (12.3%) and tonnages (19.4) resulted from fields having disease and a high nitrogen content at harvest. A closer look at the chart shows that badly diseased fields (leaf spot, virus yellows, *Sclerotium*, root rot, nematodes or combinations of these) that were low in nitrogen at harvest were more than 1% higher in sugar and still equal in tonnage to diseased fields that were high in nitrogen at harvest. Fields that were disease-free, but high in nitrogen at harvest averaged 14.6% sugar when harvested late in November. When sampled earlier, however, (all fields were sampled periodically throughout the fall of 1958) fields of this type were no better than the high nitrogen diseased fields that averaged 12.3% sugar.

If we go back to the paragraph on the 1958 crop, we can find a logical explanation for this late season build-up of sugar in 1958—*a long cool dry fall.* Notice, however, that these high-nitrogen-at-harvest fields still failed to equal the low nitrogen fields in sugar percent, and were no better in tonnage. If we had experienced a warm wet fall in 1958, as we did in 1957, our sugar content on high nitrogen fields would have remained low all during fall harvest as they did in 1957. Several years ago, fields nitrogen-deficient at harvest were lower in tonnage and in sugar per acre, but higher in sucrose content than were fields which did not run out of nitrogen by harvest. In 1957 and 1958, however, tonnages on fields low in nitrogen at harvest were not necessarily lower than fields higher in nitrogen at harvest. This reversal would indicate—at least under our 1957 and 1958 climatic conditions—that we had few fields which failed to produce well because of a lack of available nitrogen during the growing season.

This may seem to be over-stressing the importance of nitrogen in sugar beet production, but as can be seen from Fig. 2, and by looking at the 1957 and 1958 climatic influences, high nitrogen fertility in the fall can be a further depressing factor in an already poor situation.

## ROTATION

Crop rotation also should be mentioned in its relation to beet quality and sugar percentages. The quality survey made last fall showed fields in continuous row crops for at least three years (1958 included) contained the most nitrate nitrogen in petioles and the lowest sugar content at harvest. Fields in row crops only 2 years in the last three were lower in nitrate nitrogen at harvest, but only slightly higher in sugar content. Fields which had been only in broadcast crops for at least three years prior to 1958 produced beets with the highest sugar content. This could be interpreted in several ways. First, fields which had been heavily row cropped for a number of years tended to be in poor physical condition when planted to beets in 1958. This is again an adverse influence of the wet spring in 1958. A second explanation should also be considered. All of the fields having a broadcast crop history had received little or no applied nitrogen in the seasons preceding 1958. But all of the row cropped fields had nitrogen applied to each preceding crop.

## VARIETIES

One other factor which influences sugar content is variety of sugar beets used. Each year, the Spreckels Sugar Company plants from 30 to 45 replicated variety tests on cooperating growers' fields in all areas in which we contract beets. These field locations vary greatly in climate, cultural practices used, disease influence and planting and harvest date. Sugar contents vary widely between locations. In 1958, this ranged from a low test average of 9.9 percent under leaf spot conditions near Bakersfield to a high test average of 18.0 percent near Stockton.

The greatest difference within any single variety test, however was only 2.3 percent (19.6% for the high variety and 17.3% for the low variety). The high and low sugar content varieties in each of 8 widely separated 1958 test locations are pictured in Fig. 3.

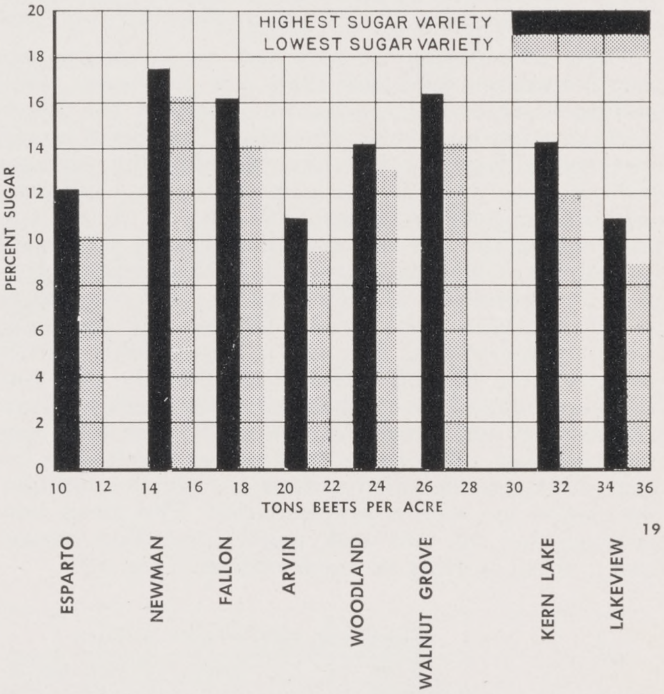

Fig. 3. **VARIETY DIFFERENCES** are of secondary importance in determining sugar content. Differences between the highest and lowest sugar varieties are much less than differences due to environmental factors like weather, disease or nitrogen.

The high and low sugar varieties in each test are plotted against the average tonnage produced by all varieties in the test. It is apparent that there is no consistent pattern in yield and sugar content. The lowest average tonnage was less than 9 tons, while the highest average tonnage was more than 38 tons. Both tests had very low sugars for all varieties (11% near Woodland and 10% near Bakersfield). A May planted test near Walnut Grove, however, produced 27 tons average with an average of 14.8% sugar. The high sugar variety in this test averaged 15.2% while the low variety averaged 14.5%. It is apparent, therefore, that while sugars vary widely under the range of growing conditions encountered in the state, the best varieties included in each test (from 8 to 16) are able to improve sugar contents less than 2.5%.

This is not an indictment of the work of the plant breeders; for plant breeders have given us disease resistance, hybrid vigor and a reasonable chance for sugar improvement. On the contrary, notice that the range between high and low variety as shown in Fig. 3 is quite constant regardless of the test average. This indicates, as we might expect, that variety improvement in sugar content tends to be linear, and therefore if a high sugar variety under conditions capable of producing 16 percent beets, should produce 17 to 18 percent beets. By the same token under conditions producing 11 percent beets, we could expect only a possible 2 percent improvement to 13 percent.

This then is the picture as we find it in California for 1959. We have all the tools available for producing the highest tonnage in history with a reasonable sugar percentages—weather permitting. The big job remains with you the grower to do the best possible job under the climatic conditions available for 1959. We are off to a fine start climatically—let us get good stands and fertilize judiciously, using a half-rate indicator strip where possible. Then let us irrigate to make the best possible use of the fertility available early in the season. This will help prevent being caught with large amounts of unused nitrogen on the soil surface in the fall, when an untimely rain could return it to the root zone just in time to prevent sugar accumulation.

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## NACIMIENTO DAM

*(Continued from Page 12)*

dam is completed. The management of the level of the impounded water determines the usefulness of the dam.

When the dam is full and overflowing at the spillway lip (800 feet elevation above sea level) there is impounded behind the dam 360,000 acre feet of water. When the water has been released to the 767 foot elevation mark, there remains impounded 200,000 acre feet of water. The difference—160,000 acre feet—is flood control storage, and is released in anticipation of heavy rainfall in the reservoir's water shed. The remaining 200,000 acre feet is held in reserve, to be fed into the Salinas Valley for percolation in order to keep the Salinas River flowing year-around into the ocean. This flow of the Salinas River not only replenishes overdraft from wells in the Salinas Valley, but also tends to push back the salt water intrusion which has become serious near the mouth of the river.

### FUTURE PLANS

The water needs of the Salinas Valley are increasing and will continue to increase. In anticipation of meeting these needs a second dam (on the San Antonio River) is in prospect. Preliminary discussions between San Luis Obispo County and Monterey County supervisors have resulted in a plan whereby the San Antonio Dam will be built, and water rights retained, by Monterey County. In exchange, 17,500 acre feet of water from the Nacimiento reservoir will be made available for San Luis Obispo County.

# SPRECKELS-SPONSORED FARM YOUTHS WIN AWARDS

EACH SPRING for the past fourteen years Spreckels Sugar Company has had the opportunity of becoming acquainted with a new representative of California's rural youth. This comes about through the company's participation in a program sponsored by the San Francisco Junior Chamber of Commerce, which make a merit award to several 4-H and Future Farmers at San Francisco's Junior Grand National. These awards, which are made by the City's business firms, provide the winner with funds to purchase a calf which will be fed during the year and shown at the following year's Junior Grand National.

It is reassuring indeed to meet these young people, who have contributed so much to their club and community, as well as applied themselves with great diligence to the care of their project and to their school work.

At the 1958 Junior Grand National James Hansen was selected to received the Spreckels-sponsored merit award. Jim was a member of the Ceres 4-H Club at the time the award was granted. He is now a freshman chemistry student at Brigham Young University in Utah. He is attending BYU on a scholarstic scholarship, one of four such scholarships granted each year

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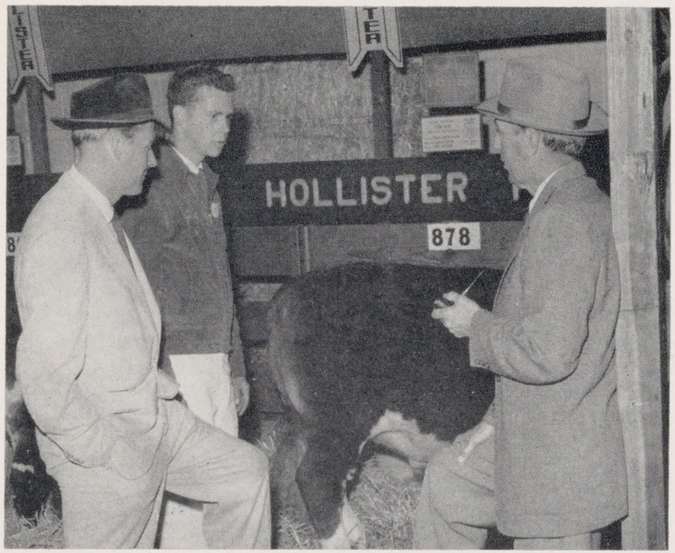
**JAMES HANSEN, left, of Ceres 4-H Club, is being awarded a certificate denoting his winning the 1958 Merit Award sponsored by Spreckels Sugar Company. The certificate was presented by S. L. Stovall, Spreckels Sugar Company livestock specialist.**



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**ERIC EGLAND, center, winner of the 1959 Merit Award discusses his FFA project steer with Larry Williams, left, Hollister vocational agricultural instructor, and Loyd Stovall, Spreckels' livestock specialist.**

by the University. Jim was a straight A student at Ceres High School and was active in student and 4-H Club activities.

The winner of the 1959 merit award, which we sponsor, was Eric Egland from the Hollister High School FFA chapter. Eric is a sophomore at Hollister High and is in his second year of FFA. He is on the chapter's public speaking team and is carrying on a livestock project. His first steer graded choice at this year's Junior Grand National.

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## MACHINE THINNING EXPERIENCES

*(Continued from Page 11)*

On another trial of "once over" with thinner and then *short* handled hoes—results were as follows.

| | |
|---|---|
| Hand thinned acreage | $33.00 per acre. |
| Machine plus short handled hoes | $22.00 per acre. |
| Hand thinning | $49.00 per acre |
| Once over machine, then hoeing & thinning | $18.00 per acre |
| Saving | $31.00 |

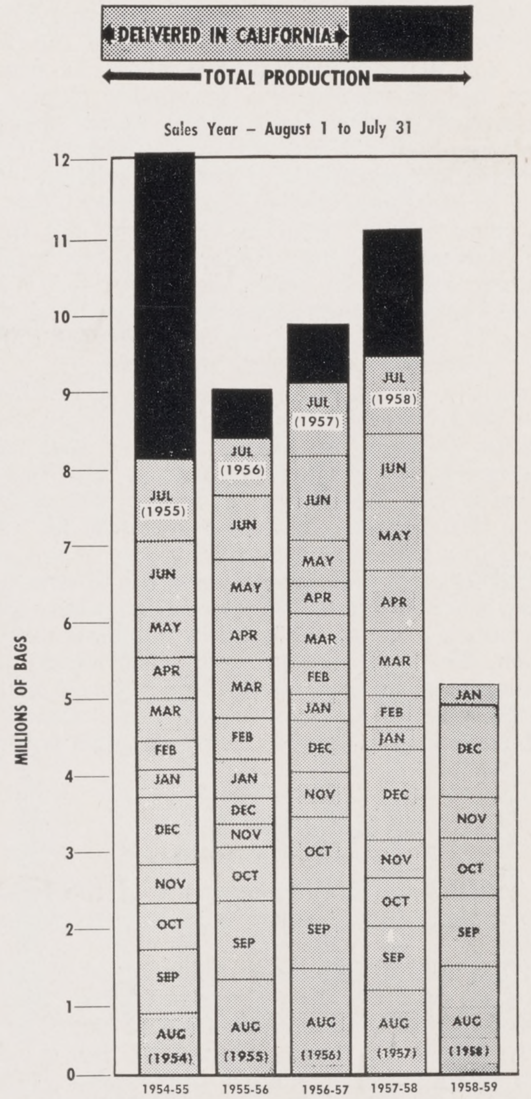
No difference in yield in machine versus hand.

Grower feels that he can do a much better job of thinning this year. Also feels he left too high a beet population last year.

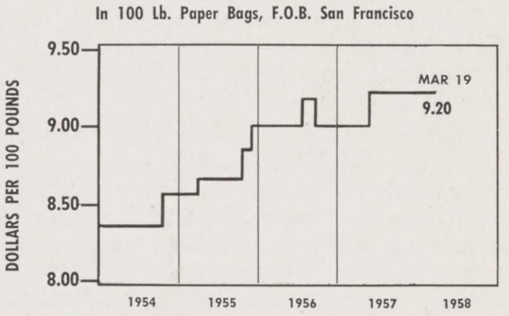
Eversman thinner used.

In closing I would like to say that even though most of our people have been reluctant to accept mechanical thinning, I feel that based on our experiences during 1958, we will have considerably more interest shown and considerably more acreage thinned by mechanical means and it is our hope that before long, the man with short handled hoe will be relegated to the same position in the thinning picture as the man with the beet knife in the harvest picture.

## PRODUCTION AND DELIVERIES OF BEET SUGAR IN CALIFORNIA



## QUOTED PRICE OF BEET GRANULATED SUGAR



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Mention of specific methods, devices and implements does not constitute an endorsement by the Company.
All photographs by the editor unless otherwise indicated.
AUSTIN ARMER, EDITOR SPRECKELS SUGAR COMPANY WOODLAND, CALIFORNIA

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SPRECKELS SUGAR BEET BULLETIN

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# CHEMISTRY IN THE BEET FIELD

There are 100 known chemical elements — at least 16 of these are essential to the growth of sugar beets.

NITROGEN
PHOSPHORUS
POTASSIUM

are the three elements most likely to need replenishment — but each field has its own special needs. See page 18.

# CHEMISTRY IN THE BEET FIELD

By DR. ROBERT F. LOOMIS

*Agronomist, University of California, Davis*

ALTHOUGH PLANT SCIENTISTS have been studying the nutrition of plants for over 300 years, progress has been greatest since the beginning of this century. Patient and ingenious research has shown that at least 16 chemical elements are *essential* to the growth of crop plants. (Table 1). Lack of any one of these 16 elements will prevent normal growth and reproduction, and lead to death of the plant. Research is continuing on the problem of whether other elements also are essential.

Table 1

Names and Chemical Symbols of the 16 Elements Known to be Essential for Crop Plants

| Major Nutrient Elements[1] | | Minor Nutrient Elements | |
|---|---|---|---|
| Carbon | C | *Zinc | Zn |
| Hydrogen | H | Copper | Cu |
| Oxygen | O | Boron | B |
| *Phosphorus | P | Manganese | Mn |
| *Potassium | K | Molybdenum | Mo |
| *Nitrogen | N | Chlorine | Cl |
| *Sulfur | S | | |
| Calcium | Ca | | |
| Iron | Fe | | |
| Magnesium | Mg | | |

*Indicates elements that are commonly or occasionally deficient where sugar beets are grown in California.

[1] Students in plant nutrition find it easy to remember the major elements by using the chemical symbols in the phrase: C HOPKNS CaFe, Mighty good.

Essential nutrient elements are conveniently divided into two groups, *major* and *minor* elements. The minor nutrient elements are sometimes referred to as trace or micro-elements. The major elements are required in much greater amounts than the minor elements. Sugar beets may use as much as 400 pounds of nitrogen per acre but only 1 or 2 pounds of manganese.

Plants obtain carbon and oxygen from air, and hydrogen from water, but the other 13 essential elements must be supplied through the soil. Most agricultural soils supply enough of all but two or three of these elements. When an element is available from the soil in smaller amounts than needed, plants become *deficient* in this element and yields are apt to suffer. Such nutrient-deficient plants frequently show *deficiency symptoms* that tell which element is deficient. For example, small tops and yellow leaves in flattened rosettes are characteristic of nitrogen deficiency.

The grower's job is to know which elements are likely to be deficient in his fields and then to supply his crops with these elements. The easiest way is to add commercial fertilizers containing the needed elements to the soil. Fertilizing a crop such as sugar beets in this way is simple in principle, but deciding on the most suitable fertilizer is not always easy. The grower must answer the questions of what nutrient elements to apply, and how much, when, and how.

## THE RIGHT APPROACH TO FERTILIZATION

Plant and soil scientists have evolved three basic approaches to fertilizer problems. Older views include the "replacement" theory and the "balance" theory.

The *replacement* theory held that the field should be supplied each year with the amount of nutrients removed by the harvested crop. Thus, if a 20-ton crop of beet roots removes 100 pounds of nitrogen, 40 pounds of phosphate, and 160 pounds of potassium per acre, then these amounts of fertilizers should be applied each year. Such a fertilizer practice doesn't make sense when you consider that some soils contain 4000 pounds per acre of available potassium—enough for 25 years of continuous cropping—and that more potassium becomes available each year through the decomposition of minerals in the soil.

With the *balance* theory, the notion existed that a proper balance should be maintained among the various nutrients applied. This might be true with some elements, such as calcium and magnesium, but it has led to many errors. Consider, for example, the popular notion that the adverse effects of excessive nitrogen can be offset by supplying the plant with extra phosphorus. This is simply not true *unless* the soil is deficient in phosphorus (Table 2). If phosphorus or some other nutrient deficiency is not limiting the plants' response to nitrogen, then too much nitrogen will always be too much nitrogen, regardless of how many other nutrients are added.

Table 2

| Pounds of nutrients applied per acre | Tons beets/per acre |
|---|---|
| No fertilizer | 22.2 |
| 200 phosphorus | 22.4 |
| 240 nitrogen | 25.6 |
| 240 nitrogen and 200 phosphorus | 30.7 |

This field in Tulare County showed a response to both nitrogen and phosphorus. Notice that there was no response to phosphorus alone, and only a slight response to nitrogen alone. The phosphorus deficiency was discovered only after adequate nitrogen had been applied.

A more realistic approach, and fortunately the one most commonly used in California, might be termed the *limiting nutrient* approach. Only those elements whose low supply would limit crop yields are supplied in the fertilizer program. In this case, the need for each nutrient is determined separately, and enough fertilizer in appropriate form is supplied for each deficiency. Thus, if phosphorus and nitrogen are both limiting to growth, then enough phosphorus fertilizer is applied before planting, and nitrogen is applied in a separate fertilizer program. This doesn't mean that you shouldn't use mixed fertilizers, but rather that the total requirements for each nutrient should be considered separately. Then it may or may not be convenient to supply a part or all the required nutrients in one mixed fertilizer.

There's one other approach to fertilization—what might be termed the "shotgun" approach. To use it, apply any fertilizer that sounds good to you, or no fertilizer at all. This approach is still used by some despite the waste involved and the poor survival of growers who practice it. If you have been using the shotgun approach, your Fieldman or Farm Advisor may be able to help you with a realistic program.

## NUTRIENT ELEMENTS NEEDED IN CALIFORNIA

NITROGEN—Very few soils in California are able to supply enough nitrogen for maximum yields of sugar beets. The peat and muck soils of the Sacramento-San Joaquin Delta are perhaps the only beet-producing areas that often require no nitrogen fertilizer. Growers should give careful attention to their nitrogen fertilizer program, not only because the element is generally required in greater amounts than other nutrient elements but also because of the danger of applying too much.

Sugar beets supplied with adequate nitrogen will grow rapidly and produce high yields, but will have low sugar percentages. If the beets are harvested while the plants contain high amounts of nitrogen, their low quality reduces returns to grower and processor alike. With present varieties it is essential that sugar beets be allowed about 30 days of nitrogen deficiency just before harvest. During this period, growth is reduced, and sugar that would have been used in producing a larger root is now stored in the root, with a higher sucrose percentage resulting. Dangers of oversupply affect only the use of nitrogen; the main concern with most other elements is to apply enough—an excess does no harm.

Determining the exact quantity of nitrogen to apply is not easy. The optimum rate will be influenced by soil type, previous crop and fertilizer history, length of growing season, and peculiarities in weather. The rate used on a certain field last year may not be right for the adjacent field this year. For example, studies in the Woodland area showed that maximum returns in different fields required rates varying from 50 to 240 pounds per acre. The danger of applying an "average" rate can be seen in Table 3. An evaluation of crop history and previous fertilizer responses in a given field will give only approximate nitrogen fertilizer rates. The only satisfactory method for determining whether this rate is correct is by *tissue analysis.* Tissue analysis services are available from private firms in several beet-growing areas. When properly interpreted by a trained agronomist (usually a part of the service), tissue analyses may be used for diagnosing deficiencies, guiding fertilization, evaluating a particular fertilizer program, or determining harvest timing.

Table 3

| Field | Pounds of nitrogen applied per acre | Days of nitrogen deficiency just before harvest | Tons beets per acre | Sugar percent |
|---|---|---|---|---|
| A | 104 | 0 | 33.9 | 12.0 |
| B | 100 | 39 | 28.9 | 15.3 |
| C | 137 | 86 | 13.9 | 16.1 |

Different fields require different amounts of nitrogen. These three fields in the Woodland area illustrate the danger of applying an "average" amount of nitrogen. All fields received about 100 pounds of nitrogen, but only Field B received an optimum amount. Field A was over fertilized and never did run out of nitrogen. The fine yield of nearly 34 tons per acre was offset by the low sugar percentage. Field C did not receive enough nitrogen. It ran out of nitrogen nearly three months before harvest. As a result, sugar percentage was good but beet yield was quite low.

Another device that should be used by every grower is *skipping and doubling*. The next time you make the final application of nitrogen to your sugar beets, leave a few rows unfertilized and double the rate on adjacent rows by fertilizing them twice. You can gain a tremendous amount of information and experience by observing these strips and comparing sucrose percentages and yields at harvest time.

PHOSPHORUS—Phosphorus deficiencies are common in the Sacramento-San Joaquin Delta, Imperial Valley, and occasional fields in Butte, Yolo, and Tulare counties. As we continue to deplete the phosphorus reserves of our soils through intensive farming, the need for phosphorus will increase. In areas where phosphorus is known to be deficient, treble superphosphate has proved adequate at a rate of 80-100 pounds $P_2O_5$ per acre, broadcast before planting. Lower rates suffice when the material is banded under the seed at planting. Also suitable for banding are soluble ammonium phosphate fertilizers that analyze 11-48-0 and 21-53-0, thus supplying some of the needed nitrogen.

On some soils that supply enough phosphorus in warm weather, seedling sugar beets, having poor root development, are hard put to find enough phosphorus during the winter and early spring. On such soils, seedling sugar beets may show marked growth responses to early phosphorus fertilization. The differences disappear by harvest time, and yields are usually not increased. Nevertheles, in such cases phosphorus fertilizers may be justified because stands are improved and earlier thinning is thereby made possible.

POTASSIUM—Most California soils are well supplied with potassium. Low potassium beets have been found in only two or three fields. However, there was no response to potassium fertilizer in these fields, perhaps because the sodium in saline soils substitutes for part of the potassium requirement.

SULFUR—Sulfur deficiencies, now found only in the Northern Sacramento Valley, were discovered when growers began using ammonia as a nitrogen source in place of ammonium sulfate. Beets growing on sulfur-deficient soils respond well to sulfur applied as gypsum (calcium sulfate) or ammonium sulfate, or to aqua ammonia enriched with poly-sulfides.

CALCIUM, MAGNESIUM, AND IRON—These elements are not known to be deficient in any of our beet-producing areas. "Tip burn," a symptom of calcium deficiency, is sometimes observed on rapidly growing beets. Since the symptom occurs even on highly calcareous soils, it appears to be the result of plant inability to absorb calcium rapidly, not of a soil deficiency.

MINOR NUTRIENT ELEMENTS—We hear a lot about minor-element deficiencies in California, but only zinc has been a problem in beet-growing areas, and only rarely. Zinc deficiencies have been encountered on young alluvial soils in the Clarksburg area, and on recently leveled lands in other areas. Commonly, it appears only on young plants and disappears as the plant roots explore the deeper soil layers and get enough zinc. Zinc sulfate or one of the newer zinc chelates, applied at planting time or sprayed on the leaves when deficiency symptoms appear, will correct the condition.

There is no magic to minor elements. If you encounter unusual symptoms in your beets, a minor-element deficiency is unlikely. It would pay to consult an expert before embarking on a minor element program. A test plot, conducted with your field superintendent or farm advisor will determine which—if any —minor elements would be beneficial.

# The 1958 Honor Roll

These are the Spreckels Growers whose 1958 crops exceeded 25 tons per acre. The large number of names on this list and the high values of sugar per acre are noteworthy in view of the many adversities which beset the 1958 crop.

## DISTRICT 1—SPRECKELS

| Grower | Acres Harvested | Tons Per Acre | Lbs. Sugar Per Acre |
|---|---|---|---|
| **Schuman Farms** | **12** | **48.45** | **13,207** |
| **L. J. Lazo & Paul DeoCampo** | **20** | **37.46** | **10,159** |
| **Jim Fanoe** | **138** | **36.87** | **11,245** |
| **Arcotti Brothers** | **15** | **36.77** | **10,332** |
| **Mine Brothers** | **11** | **36.73** | **8,345** |
| **Farley Fruit Co.** | **40** | **36.68** | **9,654** |
| **Tognetti Brothers** | **34** | **36.62** | **9,712** |
| **O. O. Eaton, Inc.** | **19** | **36.59** | **10,106** |
| **John Oreggia** | **60** | **36.50** | **10,315** |
| **M. D. Loveless & Son** | **23** | **36.12** | **10,244** |
| **T. O. Tomasello Co.** | **21** | **35.82** | **9,098** |
| **Tom DaRosa** | **65** | **35.49** | **10,171** |
| **O. O. Eaton, Inc.** | **4** | **35.18** | **8,865** |
| **Peter A. Stolich Co., Inc.** | **43** | **35.06** | **9,396** |
| **M. R. Stephenson & Son** | **23** | **34.94** | **9,112** |
| **Farley Fruit Co.** | **17** | **34.75** | **8,250** |
| **Pete Vojvoda** | **9** | **34.64** | **8,667** |
| **Peter A. Stolich Co., Inc.** | **55** | **34.57** | **10,648** |
| **Albert C. Hansen & Son** | **129** | **34.31** | **9,669** |
| **Leo & Robert Meyer** | **33** | **34.24** | **9,724** |
| **Pete Vojvoda** | **14** | **34.22** | **10,198** |
| **Taix, Vessey & Auker Co.** | **24** | **34.14** | **8,378** |
| **Clark & Togni** | **30** | **34.13** | **8,771** |
| **Ferry-Morse Seed Co** | **10** | **33.83** | **10,264** |
| **K. Kamimoto** | **21** | **33.80** | **8,477** |
| **J. J. Crosetti** | **47** | **33.79** | **8,745** |
| **Arrow Lettuce Co.** | **11** | **33.77** | **8,888** |
| **Jerome Kantro Co.** | **38** | **33.71** | **8,313** |
| **J. J. & H. Violini** | **18** | **33.69** | **9,689** |
| **John D. Domingos** | **38** | **33.49** | **10,201** |
| **L. & A. Salmina** | **15** | **33.37** | **10,418** |
| **H. F. Trafton & Son** | **54** | **33.35** | **9,852** |
| **W. M. Sullivan** | **11** | **33.17** | **9,659** |
| **Pauline Capitanich** | **34** | **33.08** | **8,303** |
| **Nunes & Hooks** | **31** | **33.08** | **9,229** |
| **Taix, Vessey & Auker Co.** | **9** | **33.00** | **7,610** |
| **West Coast Farms** | **14** | **32.99** | **10,497** |
| **William D. Crinklaw** | **104** | **32.95** | **8,633** |
| **Ralph C. Harrington** | **47** | **32.91** | **9,393** |
| **Margaret Ryan** | **10** | **32.85** | **9,053** |
| **Franscioni-Griva Co.** | **51** | **32.75** | **9,393** |
| **Wm. D. Crinklaw** | **74** | **32.73** | **8,948** |
| **Franscioni & Co.** | **24** | **32.42** | **9,778** |
| **Botelho Brothers** | **10** | **32.07** | **8,640** |
| **John Gardoni** | **15** | **31.97** | **10,301** |
| **Dean E. Pryor** | **30** | **31.88** | **8,314** |
| **James M. Hughes** | **38** | **31.84** | **8,966** |
| **R. V. Tidd** | **42** | **31.83** | **8,849** |
| **Clifford W. Swanson** | **18** | **31.70** | **8,686** |
| **Michael K. Reed** | **21** | **31.66** | **8,415** |
| **Manuel Dias** | **2*** | **31.59** | **10,039** |
| **E. H. Abeloe & Son** | **40** | **31.50** | **9,469** |
| **Frank S. Corda** | **20** | **31.49** | **9,712** |
| **L. C. H. Company** | **19** | **31.44** | **10,055** |
| **Charles & Robert Lanini** | **29** | **31.42** | **9,319** |
| **Forden Farms** | **23** | **31.37** | **8,395** |
| **Bruce Church, Inc.** | **26** | **31.09** | **7,455** |
| **Angelo Corda** | **21** | **30.99** | **10,121** |
| **A. C. Petersen** | **10** | **30.98** | **9,325** |
| **James & Manuel Luis** | **62** | **30.96** | **9,108** |
| **Peter Vucovich** | **14** | **30.87** | **8,471** |
| **J. E. Culver & Son** | **68** | **30.71** | **9,796** |
| **E. John Nielsen Co.** | **33** | **30.70** | **10,229** |
| **Turri Brothers** | **83** | **30.69** | **9,379** |
| **R. J. Thorne** | **25** | **30.68** | **7,872** |
| **Antonio F. Silveira & Sons** | **30** | **30.61** | **8,968** |
| **Turri Brothers** | **61** | **30.31** | **9,172** |
| **John Silveria & Sons** | **54** | **30.27** | **8,512** |
| **West Coast Farms** | **48** | **30.25** | **8,313** |
| **O. O. Eaton, Inc.** | **27** | **30.10** | **8,512** |
| Roy W. Johnson | 24 | 29.98 | 8,922 |
| I. Sciaroni & Jack Ferrasci | 24 | 29.94 | 8,635 |
| W. & S Packing Co. | 43 | 29.83 | 6,998 |
| Antonio F. Silveria & Sons | 9 | 29.79 | 8,246 |
| Jensen Farms, Inc. | 160 | 29.74 | 8,690 |
| Manuel Silva | 68 | 29.64 | 7,991 |
| L. Marihart | 52 | 29.60 | 7,696 |
| Victor Johnson | 10 | 29.52 | 8,555 |
| Frank Taylor | 28 | 29.35 | 7,361 |
| Taix, Vessey & Auker Co. | 10 | 29.34 | 5,980 |
| Joseph B. Silva | 31 | 29.30 | 8,860 |
| G. W. Herbert | 67 | 29.21 | 7,735 |
| Burke Farms Co. | 29 | 29.10 | 8,125 |
| Henry Guidotti & Son | 36 | 29.09 | 8,198 |
| Les Jewett Co. | 11 | 29.03 | 7,768 |
| Mary F. & E. E. Nutting | 40 | 29.00 | 8,207 |
| Carl M. Nielsen | 34 | 28.95 | 8,801 |
| Joe Merkle | 29 | 28.95 | 8,042 |
| Arnold Bassetti | 12 | 28.95 | 8,257 |
| Bergschicker & Schmidt | 11 | 28.76 | 7,155 |
| Pryor Farms | 46 | 28.69 | 8,022 |
| San Vincente Farms, Inc. | 19 | 28.69 | 9,066 |
| Schween Brothers | 3 | 28.61 | 6,758 |
| Nunes Brothers | 75 | 28.58 | 8,951 |
| Hideomi Hatai | 4 | 28.43 | 7,454 |
| Pete Vojvoda | 16 | 28.39 | 8,051 |
| Lawrence Albertsen | 47 | 28.38 | 8,247 |
| Fanoe Bros. & Sons | 181 | 28.37 | 8,851 |
| Latasa Brothers | 134 | 28.32 | 9,119 |
| Ray Rianda | 25 | 28.30 | 7,567 |
| Raphael Pura | 20 | 28.29 | 7,718 |
| Salinas Valley Vegetable Exchange | 82 | 28.16 | 7,468 |
| Francis H. Rianda | 25 | 28.11 | 8,900 |
| Harden Farms of California | 184 | 28.08 | 7,615 |
| Ambrosini & Pisoni | 23 | 28.07 | 8,589 |
| Bruce Church, Inc. | 32 | 28.00 | 6,748 |
| Tony L. Silveira | 25 | 27.90 | 8,297 |
| Thomas B. Porter | 40 | 27.86 | 8,219 |
| Clark & Romans | 96 | 27.83 | 7,932 |
| Michael K. Reed | 28 | 27.79 | 7,203 |
| C. L. & A. W. Johnson | 64 | 27.57 | 8,205 |
| A. D. Villarba | 10 | 27.56 | 7,265 |
| W. B. Grainger Packing Co. | 67 | 27.51 | 6,470 |
| L. C. H. Company | 28 | 27.49 | 8,077 |
| Edward H. Johnsen | 11 | 27.37 | 7,089 |
| Fujii Brothers | 6 | 27.35 | 7,401 |
| Borzini Brothers | 26 | 27.19 | 7,287 |
| James H. Watson | 32 | 27.18 | 8,078 |
| Frank J. Silva | 30 | 27.08 | 7,398 |
| C. Domenighini & Sons | 21 | 27.08 | 7,469 |
| Charles Morgantini & Sons | 10 | 27.07 | 7,785 |
| Charles Gianolini | 39 | 26.99 | 7,984 |

| Grower | Acres Harvested | Tons Per Acre | Lbs. Sugar Per Acre |
|---|---|---|---|
| Chester B. Imwalle | 17 | 26.89 | 6,298 |
| W. & S. Packing Company | 64 | 26.86 | 7,129 |
| Peter Vucovich | 13 | 26.85 | 6,568 |
| Richard & Timo Del Piero | 14 | 26.84 | 7,220 |
| Albert C. Hansen & Son | 40 | 26.79 | 8,107 |
| R. Sargenti & Son | 24 | 26.77 | 7,544 |
| Ira Hudson & Son | 100 | 26.72 | 7,834 |
| Guido Sargenti | 30 | 26.65 | 6,929 |
| John Martin | 18 | 26.65 | 7,915 |
| Jackson Vessey | 21 | 26.63 | 8,548 |
| L. W. Wing | 240 | 26.50 | 8,035 |
| Ben Masciarini | 49 | 26.50 | 7,150 |
| Corda & McDougall | 30 | 26.36 | 7,950 |
| Fabretti & Dedini | 46 | 26.34 | 7,012 |
| Manuel Cunha | 33 | 26.27 | 7,792 |
| R. B. Little | 52 | 26.24 | 8,523 |
| Joe Pacheco | 5 | 26.05 | 7,977 |
| T. R. Smith | 50 | 26.03 | 7,486 |
| Botelho Brothers | 10 | 26.03 | 7,174 |
| California Orchard Co. | 49 | 26.01 | 7,522 |
| A. Frew | 37 | 25.87 | 7,839 |
| Robert A. Smith | 28 | 25.79 | 7,453 |
| Arthur Bigiogni | 14 | 25.79 | 7,752 |
| Jim Fanoe | 24 | 25.76 | 7,496 |
| Bruce Church, Inc. | 36 | 25.73 | 7,256 |
| Harold E. Widemann | 14 | 25.71 | 8,397 |
| James Vanoli & Son | 19 | 25.68 | 7,612 |
| Foster Hutchings | 24 | 25.67 | 7,008 |
| Johnson Brothers | 34 | 25.57 | 7,308 |
| Chester B. Imwalle | 9 | 25.48 | 6,497 |
| Mary F. & E. E. Nutting | 37 | 25.42 | 7,804 |
| Joe P. Gambetta | 33 | 25.30 | 7,863 |
| San Felipe Cattle Co. | 25 | 25.30 | 7,757 |
| Schween Brothers | 196 | 25.20 | 6,300 |
| Antonio F. Silveira & Son | 10 | 25.15 | 7,294 |
| James H. Watson | 14 | 25.14 | 7,763 |
| M. S. Furtado & Son | 15 | 25.08 | 5,924 |
| Peter Vojvoda, Jr. | 19 | 25.05 | 7,049 |

## DISTRICT II—MANTECA

| Grower | Acres Harvested | Tons Per Acre | Lbs. Sugar Per Acre |
|---|---|---|---|
| **Dodge Brothers** | **4** | **35.55** | **11,489** |
| **Hengst Farms, Inc.** | **40** | **34.88** | **9,430** |
| **R. E. Thorsen** | **38** | **34.78** | **9,090** |
| **Ed Thoming** | **32** | **33.21** | **9,470** |
| **Albert J. Perry** | **71** | **32.80** | **8,628** |
| **Larry Gerhart** | **1*** | **32.54** | **9,296** |
| **Joe G. Fanucchi** | **31** | **31.87** | **8,093** |
| **K. Sasaki** | **20** | **30.67** | **9,067** |
| **Sanders & Sanders** | **154** | **30.28** | **5,515** |
| Howard E. Moore | 14 | 29.96 | 7,415 |
| Albert E. Lerno | 18 | 29.92 | 7,207 |
| W. F. Pierson | 23 | 29.36 | 9,179 |
| Enrico Pizzi, Jr. | 1* | 29.35 | 8,462 |
| Vito Di Leo | 18 | 29.21 | 8,095 |
| Ed Thoming | 20 | 29.05 | 8,531 |
| Porter Land Co. | 76 | 28.75 | 5,148 |
| Nobuo Sakamoto | 41 | 28.65 | 7,775 |
| A. Pellegri & Son | 24 | 28.63 | 8,382 |
| Pelucca, Worley & Wright | 35 | 28.31 | 8,695 |
| Tony Castanho | 39 | 28.30 | 8,985 |
| Joe Escobar, Sr. | 10 | 28.07 | 8,401 |
| Bob Belluomini | 1* | 28.05 | 8,711 |
| Bertrand Thomas | 40 | 28.02 | 9,084 |
| Uyeda Brothers | 20 | 27.99 | 8,450 |
| Craven Brothers | 20 | 27.76 | 7,871 |
| Richard Alcock | 20 | 27.68 | 7,805 |
| Arnold Gouveia | 2* | 27.59 | 7,888 |
| Nobuox Sakamoto | 41 | 27.32 | 8,307 |
| Leo R. Gerhart | 39 | 27.22 | 7,807 |
| Joe Sabbatini | 45 | 27.20 | 7,729 |
| Robertson & Sons | 53 | 27.18 | 7,867 |
| Grant & Wilson | 48 | 27.02 | 7,450 |
| J. Sanchez & Son | 80 | 27.01 | 7,362 |
| Robert Cardwell | 13 | 27.01 | 7,553 |
| John Bava | 16 | 26.84 | 5,186 |
| Estate of John Borba | 20 | 26.67 | 8,281 |
| Antognini Brothers | 36 | 26.47 | 6,703 |
| John V. Cella | 20 | 26.41 | 7,657 |
| Joe G. Banducci | 39 | 26.38 | 6,005 |
| Joe Garsino | 48 | 26.36 | 7,915 |
| Roger L. Remonda | 15 | 26.33 | 8,368 |
| Sanders & Sanders | 26 | 26.33 | 4,600 |
| J. H. Cardwell | 15 | 26.27 | 6,987 |
| Banducci Farming Co. | 213 | 26.20 | 6,302 |
| Mike Pierini | 20 | 26.11 | 7,500 |
| Manuel J. Gonsalves | 89 | 25.95 | 6,894 |
| Joe Alvarez | 18 | 25.81 | 5,973 |
| David Vana | 27 | 25.76 | 7,231 |
| Clayton Brown | 59 | 25.73 | 7,316 |
| John Paulson | 55 | 25.67 | 7,423 |
| Kaiser & Lindeman | 93 | 25.65 | 7,685 |
| Donald Fink | 41 | 25.53 | 6,238 |
| Tony A. Sanchez | 60 | 25.44 | 8,407 |
| Antognini Brothers | 51 | 25.31 | 7,286 |
| Lloyd Shimer | 17 | 25.21 | 5,589 |
| Joe Garsino | 29 | 25.04 | 6,969 |
| Norman Vogt | 247 | 25.02 | 5,912 |

## DISTRICT III—WOODLAND

| Grower | Acres Harvested | Tons Per Acre | Lbs. Sugar Per Acre |
|---|---|---|---|
| **Arnold Collier** | **85** | **33.34** | **10,469** |
| **H. & R. Kodama** | **10** | **33.27** | **10,467** |
| **E. A. & Glenn Watkins** | **48** | **30.60** | **9,223** |
| Tim Yoshimiya | 29 | 29.19 | 7,665 |
| Pete Konitzer | 122 | 29.11 | 8,029 |
| Meek & LeMaitre | 82 | 28.94 | 8,613 |
| Manuel Antone | 4 | 28.39 | 9,857 |
| Chew Brothers | 142 | 28.34 | 8,995 |
| John J. Vanetti | 35 | 28.06 | 8,822 |
| Donald H. Wilson | 50 | 28.05 | 9,369 |
| Hahn & Peters | 42 | 27.97 | 9,057 |
| Oji Bros., Uno & Terao | 10 | 27.48 | 8,969 |
| Arnold Collier | 29 | 27.30 | 8,163 |
| M. Martinez | 67 | 26.98 | 8,191 |
| A. J. Rodgers, Jr. | 12 | 26.96 | 8,724 |
| W. H. Meek & Meek & LeMaitre | 57 | 26.85 | 7,164 |
| Robert C. Gill | 91 | 26.70 | 7,588 |
| Arthur N. Oji | 171 | 26.66 | 7,742 |
| Mas Oji | 124 | 26.61 | 7,179 |
| Hahn & Peters | 106 | 26.47 | 8,084 |
| Wetzel Brothers | 44 | 25.63 | 7,786 |
| Carl Wiegand | 27 | 25.62 | 7,696 |
| John E. Jackson | 14 | 25.52 | 6,574 |
| Frates & Shimada | 74 | 25.48 | 7,634 |
| Dan G. Best | 40 | 25.38 | 7,726 |
| Floyd E. Warner | 51 | 25.35 | 7,676 |
| Oji Bros., Uno & Terao | 101 | 25.32 | 5,813 |
| Montgomery & Towne | 34 | 25.29 | 7,086 |
| Tim Yoshimiya | 4 | 25.13 | 7,785 |
| George M. Struve & Son | 356 | 25.00 | 7,855 |
| Thomas R. Mabalot | 21 | 25.00 | 7,245 |

* These small contracts are the plots of 4-H and Future Farmer club members. The Company extends its sincere compliments to the young people who have done such splendid work.

# FERTILIZERS AND THEIR PLANT FOOD CONTENT

By SIDNEY H. BIERLY
*General Manager*
*California Fertilizer Association*

WE SPEAK OF plant food elements removed from the soil by crops. The three primary elements, nitrogen, phosphorus, and potassium, have long been called plant foods. Gradually the secondary elements, calcium, magnesium, and sulfur, and the micro elements, including boron, manganese, copper, zinc, iron, molybdenum, and chlorine have been added to the list of nutrients required for normal plant growth.

Strictly speaking, these elements secured by the plant from the natural supply in the soil or from fertilizer materials added to the soil, are not plant foods but simply the raw materials or nutrient elements used within the green plant. The plant uses these raw materials in the manufacture of complex carbohydrates and proteins and these products serve as a source of food and energy within the plant.

However the term, "plant food," as applied to the N-P-K in a fertilizer for many years in the industry, and more recently to the secondary and micro elements, is a part of the wording of the fertilizer control laws.

Thus we see that the term, "plant food" has two shades of meaning.

The term, "unit of plant food" has been adopted as an official chemical term by the Association of Official Agricultural Chemists with the following definition: "A unit of plant food is twenty (20) pounds, or one per cent (1%) of a ton."

At times in the field we hear the expression, "we will use "X" units of nitrogen (or other plant food) per acre." This use of the term "units" is not technically correct. The term "units" is related only to the percent content of plant food in a *ton* of fertilizer material. In actual practice, when the term "units per acre" is used, they are really referring to, "pounds of plant food per acre."

A fertilizer grade represents the minimum guaranty of a commercial fertilizer's plant food content. This grade is expressed in terms of the percentage of nitrogen (N.), available phosphoric acid ($P_2O_5$), and water soluble potash ($K_2O$).

When secondary and micro elements are added to a fertilizer mixture, their content is expressed as a percent of the element added.

Fertilizer manufacturers are required by law to label the individual bags to show the guaranteed analysis of plant food stated to be present. The analysis is usually in whole numbers and the plant foods are always stated in the same sequence, for example a 10-10-5 fertilizer is one that contains 10% nitrogen, 10% available phosphoric acid and 5% water soluble potash.

Fertilizer materials contain different quantities of the various plant food elements. The principal nitrogen carriers are listed in the following table:

| | % N. |
|---|---|
| Ammonium nitrate | 33.5 |
| Ammonia-ammonium nitrate solution | 40.0 |
| Ammonium nitrate solution | 20.0 |
| Ammonium sulfate | 21.0 |
| Anhydrous Ammonia | 82.0 |
| Aqua ammonia | 20.0 |
| Calcium nitrate | 15.5 |
| Calcium-ammonium nitrate solution | 17.0 |
| Calcium cyanamide | 21.0 |
| Nitrate of soda | 16.0 |
| Urea | 45.0 |
| Urea solution | 23.0 |
| Urea ammonium nitrate solution | 32.0 |

In addition to the above nitrogen carrying materials, the fertilizer industry can provide a series of nitrogen-phosphorus and nitrogen-phosphorus-potassium compounds having a wide range of percentage formulae.

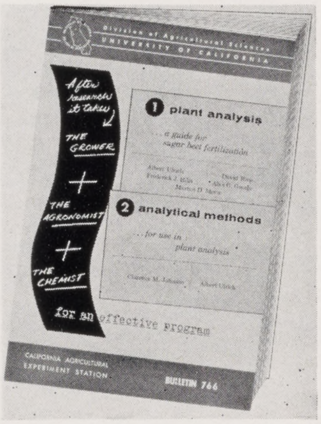
Most fertilizer recommendations are expressed in the terms of "pounds of plant food per acre." For example, a fertilizer recommendation for sugar beets might be to use 150 pounds of nitrogen per acre.

The amount of fertilizer to be applied per acre to supply 150 pounds of nitrogen will depend on the analysis or percent composition of the fertilizer material that is to be used. A grower can easily determine how much fertilizer to use, to illustrate:

> Sulfate of ammonia contains 21% nitrogen. This means that 100 pounds of this nitrogen carrying material holds 21 pounds of nitrogen or that 1 ton of sulfate of ammonia carries 420 pounds of nitrogen. To calculate how many pounds of sulfate of ammonia are needed to supply 150 pounds of nitrogen per acre, we simply divide the unit content 21% into the 150 pounds of nitrogen needed.
>
> (150# N. ÷ .21 = 714 + pounds of sulfate of ammonia.)

This same formula may be used with any of the nitrogen materials listed.

# NEW BULLETIN ON PLANT ANALYSIS



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A NEW FREE bulletin has been issued by the University of California on the subject of plant analysis, a scientific tool to guide fertilization.

In its first part, the U. C. bulletin describes plant analysis and tells how to use it to determine the fertilization needs of sugar beets under commercial field conditions.

The second part of the 78-page bulletin describes the analytical methods of plant analysis for many crops as they are used in University of California laboratories.

U. C. Bulletin 766 entitled "Plant Analysis and Analytical Methods" is available at Agricultural Extension Service Offices or from the University of California, Agricultural Publications, 22 Giannini Hall, Berkeley 4, California.

# SPRECKELS EXECUTIVES NAMED AS DIRECTORS OF COMPANY

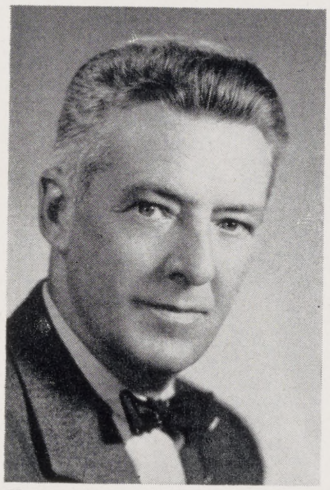
AT THE ANNUAL stockholder's meeting held in April, Spreckels Sugar Company enlarged its Board of Directors from six to eight members and elected three new directors.

The new directors are Guy D. Manuel, vice president and general agriculturist; William H. Ottey, vice president in charge of sales; and Kenneth R. Hanson of The American Sugar Refining Company of New York, who replaces Mr. Carl F. Huttlinger.

Mr. Charles de Bretteville, President of Spreckels Sugar Company, was re-elected as director.

*Moulin Photo* 25

**Guy D. Manuel**


*Morton-Waters Photo* 26

**William F. Ottey**

Mr. Manuel joined Spreckels in 1939 as a trainee in the agricultural department. He advanced through the positions of field superintendent, agricultural superintendent, and assistant district manager. He was made general agriculturalist in 1948, and vice president in 1951.

Mr. Ottey has been associated with the Spreckels organization for 13 years. After many years in the sugar brokerage business in the east, he was appointed sales manager of the Spreckels Sugar Company and the Western Sugar Refinery in 1946. Three years later he was advanced to vice president of the former company.

# PROGRESS IN MECHANICAL THINNING CONTINUES

By AUSTIN ARMER

*Aricultural Engineer, Spreckels Sugar Company*

FOR MANY YEARS mechanical thinning has been a normal procedure in sugar beet growing states other than California. But for a number of very good reasons, California has been slow to accept this important labor saving operation.

This year—1959—marks a break-through in the adoption of mechanical thinning by California's beet growers. The extent of this progress is shown in the table heading the next column.

**THREE YEARS OF MACHINE THINNING PROGRESS**
**(Percent of Total Acreage Machine Thinned)**

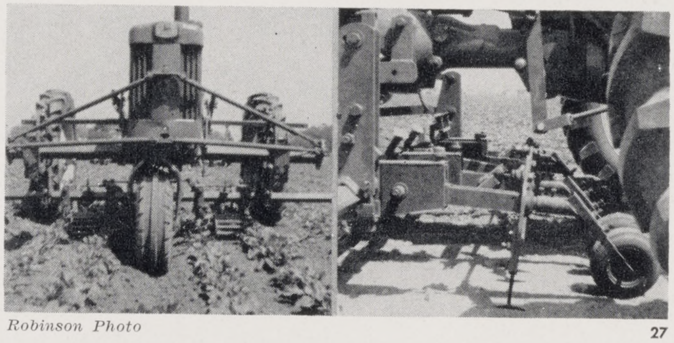
| | Spreckels | Manteca | Woodland |
|---|---|---|---|
| 1957 | 0.1 % | 1.0 % | 1.5 % |
| 1958 | 1.8 % | 2.5 % | 4.3 % |
| 1959 | 5.0 % | 26.6 % | 15.6 % |

Machines which have been purchased in the past only to be discarded have been rebuilt and put into service. Demand for new machines has taxed implement dealers beyond their capacity to supply them. And most important—manufacturers and inventive farmers have taken some bold steps toward the development of special machines to meet the unusual conditions prevalent in California.

About two years ago, the accepted concept of stand reduction was challenged by sugar beet research workers at the University of California. They concluded that, under California field conditions, random stand reduction (removing a certain percentage of plants regardless of spacing) was less satisfactory than blocking to a final plant spacing. Apparently in California, where our soil is very tough and where our seedlings are very non-uniform both in size and distribution, there may actually be a better chance of securing a uniform post-thinning stand by removing, let us say, 5 inches out of each 7 inches of row. Along with this new philosophy in thinning goes the practice of waiting for beets to reach a larger size than is possible for random stand reduction. This has a very distinct advantage in that remaining beets are less damaged in the thinning operation, and beets which are in the path of the cutting tool are more positively cut out and will not recover. This was demonstrated by the unique blocking machine devised by Ted Holthouse of Hollister in 1953.

Blocking machines using reciprocating cutters are by no means new. The Winter-Weiss "Cropmaster" was popular in Colorado a decade ago. The "Vicon" is a neatly built reciprocating thinner currently popular in Holland. A number of similar machines are built and used widely in several European countries.

At least two more bold departures in blocking machines have made their appearance in California this year. One of them is a machine now under development by Robinson-Blower and Engineering Company of San Martin. The Robinson machine is similar in principle to a number of quite early machines developed in this country and abroad. It uses the pendulum principle,


*Robinson Photo* 27

**THE ROBINSON** experimental thinning machine is a blocker employing swinging diamond-shaped knives which are so curved as to cause minimum soil disturbance.

whereby a diamond-shaped knife wig-wags down the row, entering the ground alternately from the right and from the left of the row, removing all beets or weeds in its path.

Perhaps the most radical departure from existing thinning machines is a development undertaken by Arnold Collier of Dixon. Mr. Collier has fitted the cultivating sled which he developed with a thinning attachment uniquely adapted to this particular sled. Again, a reciprocating knife does the job of blocking, leaving approximately two inches undisturbed in each nine inches of row. Details of the Collier machine are withheld pending patent application.

The acceptance of thinning machines by California growers this year, coupled with the resurgence of development effort, demonstrates that machine thinning is now a part of sugar beet culture in California, and will make giant strides in the near future.

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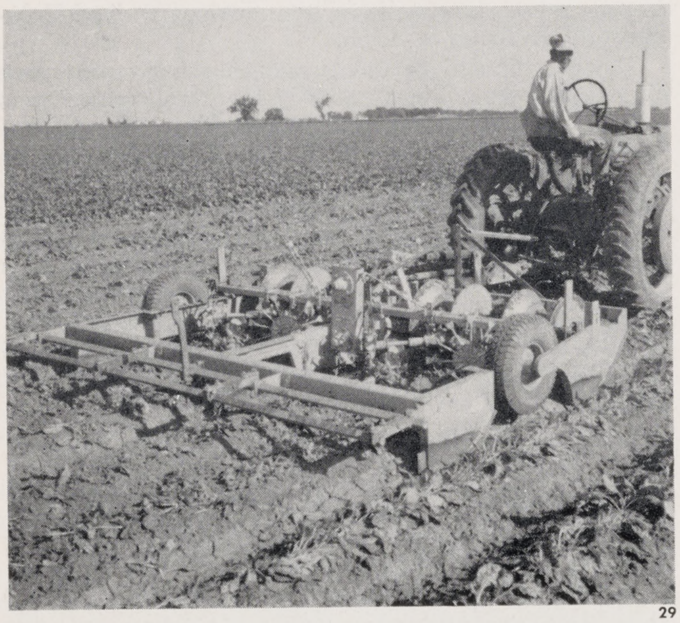
**ARNOLD COLLIER**, Spreckels grower at Dixon, shows how the experimental blocking attachment to his cultivating sled leaves the thinned beet plants in undisturbed soil, while unwanted plants are swept into the furrow.



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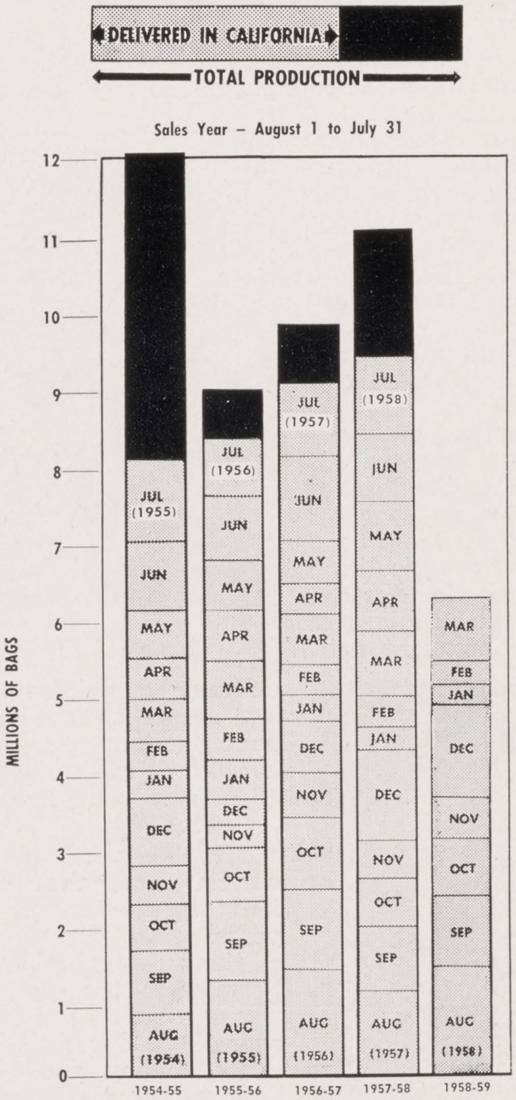
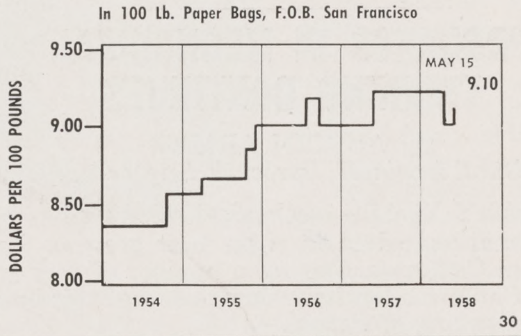
**SLED-MOUNTED** thinning machines are a natural outgrowth of the adaptability of the planting and cultivating sled. This is an Eversman 4-row thinner mounted on a K C sled; several of these combinations are in use by Spreckels growers.

## PRODUCTION AND DELIVERIES OF BEET SUGAR IN CALIFORNIA



## QUOTED PRICE OF BEET GRANULATED SUGAR



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The **SPRECKELS SUGAR BEET BULLETIN** is issued bi-monthly by the Agricultural Department of the Spreckels Sugar Company as a service to its growers. Mention of specific methods, devices and implements does not constitute an endorsement by the Company. All photographs by the editor unless otherwise indicated.

AUSTIN ARMER, EDITOR
SPRECKELS SUGAR COMPANY
WOODLAND, CALIFORNIA

PUBLISHED FOR CALIFORNIA SUGAR BEET GROWERS BY THE SPRECKELS SUGAR COMPANY

SPRECKELS SUGAR BEET BULLETIN

VOL. 23 JULY - AUGUST, 1959 NO. 4

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# CLEAN BEETS AT THE FACTORY

mean efficient factory operation and an orderly harvest. Contributing to clean beet delivery are:

HARVESTER IMPROVEMENTS
RECEIVING STATION IMPROVEMENTS
COMPETENT HARVEST SUPERVISION

The last item is the most important — see page 26.

Jul 27 '59

# CLEAN BEETS AT THE FACTORY— THE KEY TO ORDERLY HARVEST

By HUGH F. MELVIN
*Agricultural Manager*
*Spreckels Sugar Company*

WITHIN A VERY SHORT time after the publication of this issue of the bulletin, the 1959 fall harvest will be well underway. We are anticipating one of the largest crops in our experience. In order to obtain an orderly harvest and an efficient factory operation, it is essential that the factories start early and that they be maintained at a maximum capacity for the entire fall period.

The ability of the factories to operate at full capacity every day depends upon many things. Most of these are beyond the control of the farmer and must be the responsibility of our operating supervisors and personnel. There is one facet of maximum factory operating efficiency, however, which falls directly upon the grower. This is the condition in which his crop is delivered to the factory. Dirt and trash are a serious and continual source of factory problems, and it is the purpose of this article to suggest to our growers the necessity of reducing the amount of undesirable material to an absolute minimum.

There are two facts that we should establish. First, beets can be received only in a quantity equivalent to the rate of processing. This is always the case except for a short period in the late fall when temperatures permit stock piling. Anything which curtails the rate at which beets are processed must therefore also curtail harvest. Second, deliveries of dirt and trash material to the factories, independently of their effect upon the rate of processing beets, significantly increase the harvesting costs of the grower.

Here are typical chain reactions, in the field and at the factory, when excessive tare material is delivered:

*In the Field*

1. Receiving station operation is interrupted by slow unloading of trashy beets.
2. Dirt and trash pile up and excessive material is loaded into rail cars.
3. The efficiency of station operation is reduced and stoppages become frequent.
4. Growers' trucks line up.
5. Harvesters wait in the field for trucks to return. Operating time is lost.
6. More trucks are required to keep harvesters operating.

*At the Factory*

1. Trashy and dirty beets arrive.
2. Cars and bins become difficult to empty.
3. Flumes clog due to mud; trash removal equipment becomes overburdened.
4. Trash and mud are transported past overworked removal equipment and into the factory slicing station.
5. Knives are dulled and frequent changes become necessary.
6. The rate of processing at the factory falls off.

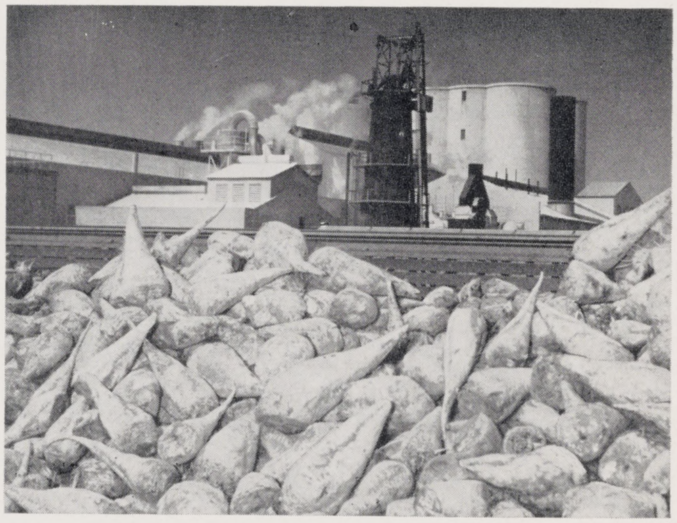
Obviously, in the field it becomes more difficult to meet harvest schedules and the slower rate of factory operation necessitates reduced harvest quotas. In both instances fewer beets are harvested than would have been had clean beets been delivered. Thus harvest is delayed and prolonged.

In addition it is costly to haul undesirable material to the receiving stations and freight must be paid on dirt that finds its way into the rail cars. The keeping qualities of beets are impaired by excessive tare material resulting in increased sugar losses and lower slicing rates.

The magnitude of the current crop dictates an exceptionally early start and an efficient harvest and factory operation. Only by operating at full capacity for every day of the fall campaign can a maximum harvest be attained. There are some things growers can do to help:

1. Keep a continual check on your harvest.
    - (a) Have the right equipment for the job. Select the harvester which operates best for your particular field conditions.
    - (b) Be sure your harvester operator is qualified and understands your desire for clean beets.
    - (c) Be sure your machinery is kept in an operating condition and is properly adjusted to deliver beets free of trash and dirt.
2. Clean up weedy spots or fields prior to harvesting.
3. Deliver your quota of clean beets according to the schedule provided by your fieldman.

Because we recognize the extreme variability in field conditions we have purposely avoided establishing clean beet standards which growers would be required to meet. We are requesting, however, that our growers judge their own performance and deliver beets as nearly 100% clean as conditions permit.



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**IT CAN BE DONE.** The cover photograph was not posed—it was taken in the beet bins at the Woodland Factory during the past campaign, and shows graphically that clean beets can be delivered by conscientious harvesting.

## CHAIN REACTION IN THE FIELD

33

**TRASHY LOADS** waste time when unloaded, slow down cleaning screen operation, and delay orderly receiving.

34

**OTHER GROWERS' TRUCKS** line up waiting for trashy, dirty beets to be unloaded. The innocent suffer with the guilty.

35

**MEANWHILE, BACK AT THE RANCH**—harvesters and crews remain idle waiting for trucks to return. Again the innocent suffer.

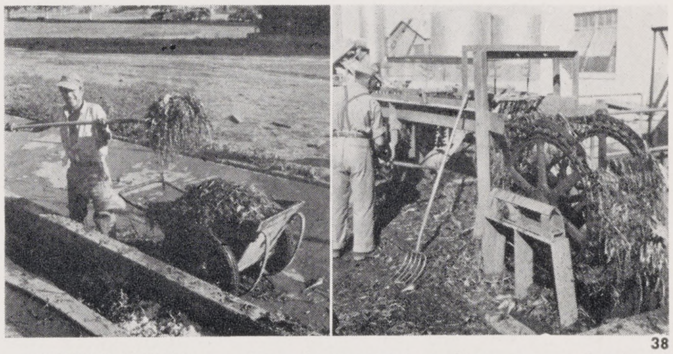
36

**MORE TRASH** than can be removed by even the best cleaning screens goes into the cars and to the factories.

## CHAIN REACTION AT THE FACTORY

37

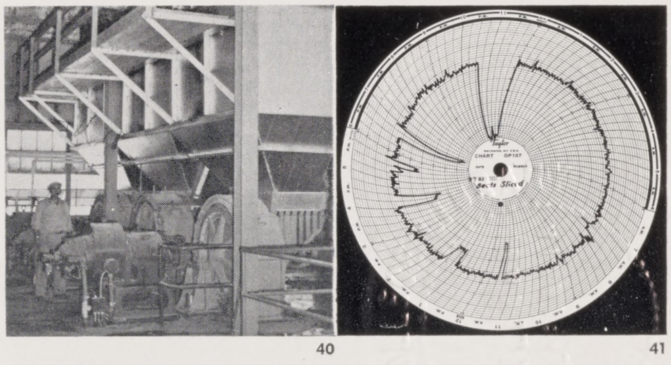
**CARS ARE UNLOADED** at the factory; clods are so numerous they must be hand picked from the beet conveyor.


38

**FACTORY FLUMES** are clogged; men and machines are overburdened to keep the beets moving into the factory.

39

**TRASH PILES UP**; fluming is interrupted while soggy heaps of weeds and leaves are trucked away.


40 41

**CUTTERS** are stopped for frequent knife changes; slice chart on right shows six interruptions in 24 hours.

# SUGAR BEET RECEIVING KEEPS PACE WITH CHANGING TIMES

MORE TONS PER ACRE, more dirt per ton. More transport trucks, bigger railroad cars. More and bigger growers' trucks.

These are some of the changes which are taking place in the beet growing picture. They all have their impact on the requirements of receiving stations, and Spreckels Sugar Company is meeting these requirements from year to year.

In 1958, new receiving stations were built at Del Paso and Cromir. Improved cleaning screens were installed at Comstock, Connor, Libfarm, Los Banos, South Dos Palos, and each of the three factory truck receiving stations.

## THE 1959 PROGRAM

Studies of the ten new cleaning screens installed in 1958 demonstrated that adjustments can be made to suit conditions at individual loading stations. Thus for any condition, the amount of dirt and trash removed can be made maximum, while the damage to beets and loss of small beets is minimized. Some very extensive tests revealed that the removal of dirt and trash is about twice that achieved by the outmoded Reinks screens, whereas the damage to beets is reduced—in some cases markedly reduced.

These studies led to the decision to speed up the screen replacement program. As a consequence, new screens are ready for use during the 1959 fall harvest at Grimes, Sucro, Swingle, Comstock, Crows Landing, Gilroy and Elsa.

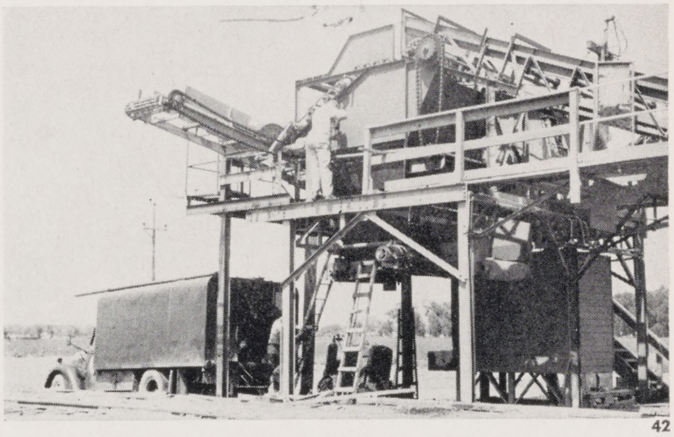
The Southern Pacific Company's program of increasing the height of all beet cars made it necessary to raise the loading conveyors on all rail receiving stations. In some instances this was a costly revision, but worthwhile in view of the advantages of bigger cars.

## THREE MORE NEW RECEIVING STATIONS

At Swingle, a major reconstruction program has been completed. Beets may now be loaded either into transport trucks or rail cars, with only a 20 second interruption needed to change from one to the other. The truck ramp has been widened to accommodate larger growers' trucks, and the hourly capacity of the entire station has been sharply increased. The increase in installed horsepower from 48 to 68 gives some idea of the greater speed in which beets can now be handled.

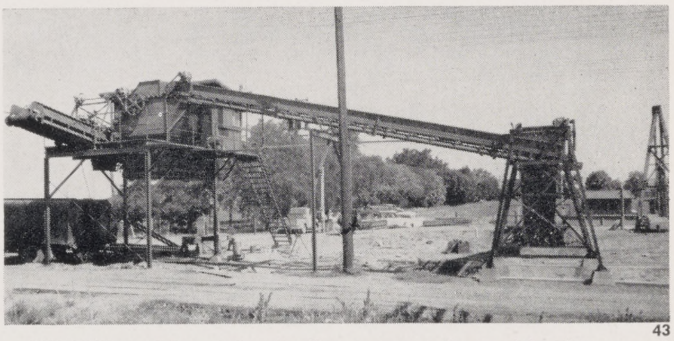
At Comstock a most unusual and advanced receiving station has been constructed. Comstock is a station which delivers solely to transport trucks, there being no railroad service to this point. This circumstance made it possible to custom-design a receiving station, resulting in an unusually neat and efficient mechanism. The hourly capacity is approximately 30% greater than that of the facility it replaces.

At Guadalupe, a new receiving station was erected on an existing railroad siding. This unit is equipped



42

**GRIMES** receiving station undergoing remodelling. A new screen will do a better cleaning job; carloading conveyor will accommodate higher cars. Similar conversions were completed at Sucro, Crow's Landing, Gilroy and Elsa.



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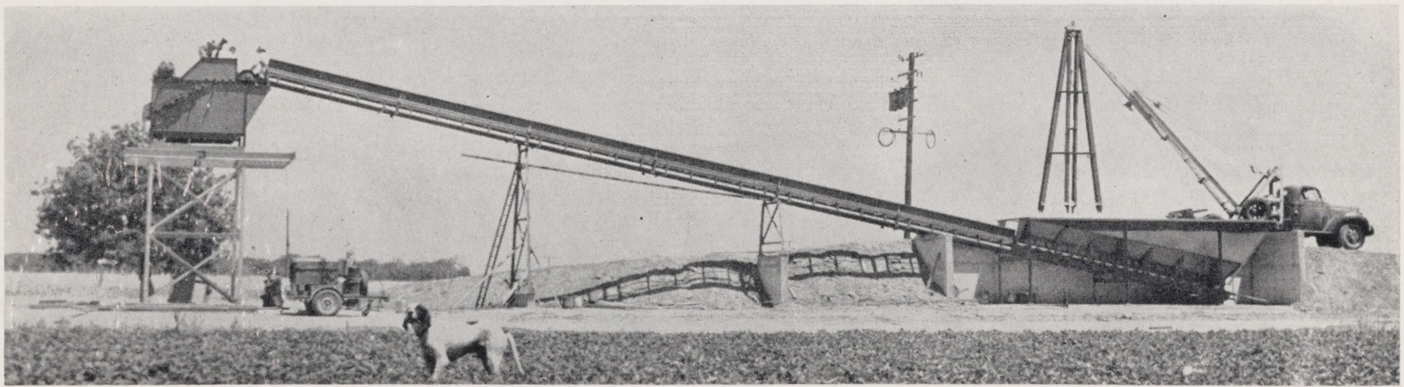
**SWINGLE** receiving station is all new except the receiving hopper and truck hoist. Capacity is increased; change from rail cars to transport trucks take only 20 seconds.



44

**COMSTOCK** receiving station is the first installation designed exclusively for high speed loading of beets into transport trucks.

with one of the new screens, and will provide the Guadalupe station with adequate capacity and up-to-date cleaning facilities.

It is noteworthy that all of the design engineering for these new receiving stations, as well as modification of older stations, was done by the Spreckels Agricultural Engineering Department; and that the construction of all machinery and erection of structural steel was done by local manufacturers and contractors.

## BIGGER BEET CARS IN SERVICE

THE SOUTHERN PACIFIC COMPANY has again increased the size of its beet cars. The high-side gondolas placed in service in 1957 have been replaced by still bigger cars, and beet tonnage has increased proportionately.

According to Mr. Charles Taggart of Southern Pacific Company's Sacramento division, there are 1,015 of the new high cars in service. 615 of these have been made from the previous high-side gondolas, and 400 of them are newly rebuilt gondolas.

The trend toward increased hauling capacity of beet cars is indicated in the following table:

| CAR TYPE | CU. FT. | TONS BEETS |
|---|---|---|
| "Blackburn" Beet Rack (1924-1950) | 1650 | 35 |
| Composite Gondola (1950-1957) | 1875 | 40 |
| High-Side Gondola (1957-1959) | 2625 | 52 |
| Extra High-Side Gondola (1959) | 3435 | 65 |

It is seen from this table that the new cars hold nearly twice the tonnage of the old Blackburn racks in use before 1950.

A number of advantages accrue from these new, larger cars. These include:

1. *More tons of beets per day at each receiving station.* A receiving station capable of handling twenty cars on its siding could load 800 tons of beets, using the old composite gondola. With the new cars the same siding can accommodate 1360 tons of beets.

2. *Less time lost in moving cars.* Assuming that three minutes is lost in moving an empty car into position for loading, one hour is lost for every twenty cars loaded. With the old gondolas this meant one hour lost for each 800 tons of beets loaded, but with the new high-side gondolas one hour is lost for each 1360 tons of beets.

Mr. Taggart pointed out that one of the factors which makes the new cars practical is Diesel motive power. The flexibility afforded by Diesel power units makes it possible to haul a heavy train without the need of doubling up on the motive power, as was required with steam locomotives. With Diesel motive power, only as many power units as are necessary for a particular train are put into service.

In order to utilize the new cars, all Spreckels receiving stations have had to be altered. In some cases, this was a major operation, and a costly one. Wherever new receiving facilities have been built, these have been designed to accommodate the new high cars.

## PLANT PHYSIOLOGIST JOINS SPRECKELS AGRICULTURAL STAFF

*Sirlin Studio Photo* 45

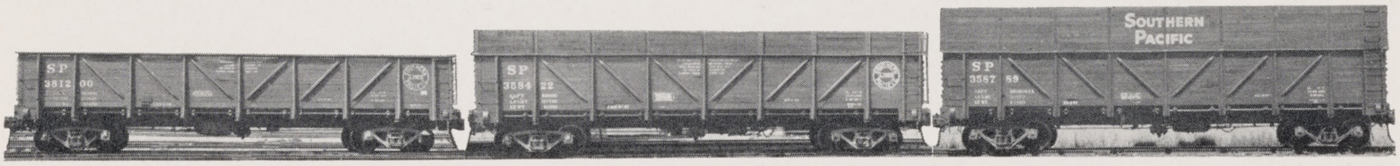
DR. VARON JENSEN

DR. VARON JENSEN joined the Special Services Staff of the Agricultural Department of Spreckels Sugar Company on July 1. Mr. Jensen very recently completed a program of graduate work at the University of California, Davis, where his major study was plant physiology. Dr. W. A. Williams of the Agronomy Department at the University served as his major professor, and directed a research program concerned with an evaluation of the tendency of mature alfalfa plants to absorb and retain foliar-applied 2,4-D in reproductive structures developing on the plant at the time of treatment.

Varon was born and reared in Mink Creek, Franklin County, Idaho. After attending elementary school here, he attended Preston High School and was graduated with the class of 1944. Varon was not present for the graduation ceremony because a draft call had taken him to Texas in February 1944 for army service with the 102nd Infantry Division which later went into action against German forces as part of the Ninth United States Army.

Varon was released from active duty with the Army in 1946 and immediately registered as a student of agricultural science at Utah State University, Logan. Following graduation with a degree of bachelor of science, a recall to active duty with the Army came in 1952. This tour of duty was only 12 months long and in the Fall of 1953 he registered as a graduate student in Agronomy at his Alma Mater. He also served as Teaching Assistant in the Agronomy Department. In the summer of 1955, Varon was awarded a research assistantship at the University of California, Davis, under a grant from the California Crop Improvement Association.

With the completion of graduate training in plant physiology, he has now accepted employment with Spreckels Sugar Company. His research program will be concerned mainly with physiological aspects of problems associated with purity in sugar beets. He holds membership in the American Society of Plant Physiologists and in the Society of the Sigma Xi.



1950 - 1957. Capacity 40 tons 1957 - 1959. Capacity 52 tons 1959 - Capacity 65 tons 46

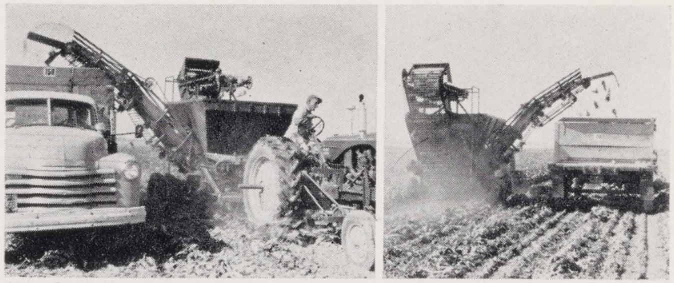
# NEW HARVESTERS FEATURE BETTER CLEANING OF BEETS

THE THREE SUGAR BEET Harvesters most popular in California — Farmhand, Gemco, and Marbeet—have all made important changes in their 1959 models. While many of these changes are evolutionary, and came about simply because weak points were revealed in earlier models, there is one important characteristic common to all of them which has been deliberately engineered. This was done in a sincere effort to bring about the delivery of cleaner beets from the harvesting machines.

Farmhand and Gemco, outwardly similar because of their common ancestry, have each attacked the dirt problem in a different way. The 1959 Farmhand is a cart model, with a tank holding approximately 7500 pounds of beets. Cleaning takes place in four stages. First there is a five-shaft kicker roll assembly with alternating octagon and star wheel kickers. Next the beets are elevated to a potato chain sorting table where (if necessary) clods can be actually hand picked by a man riding the machine. Finally the beets from the tank are delivered to the truck on a potato chain conveyor which has a dirt removing effect. Thus the beets are first cleaned on the kicker rolls, second on the potato chain elevator to the sorting table, third (optionally) hand picked, and fourth elevated over a potato chain for final cleaning.

Gemco has developed a cart model, but they still offer the model which delivers direct to a following truck. Both models have a quite elaborate cleaning screen preceding the final potato chain elevator. This screen embodies twelve kicker roll shafts with a graduated variety of kicker wheels, starting with rubber star wheels; next, steel star wheels; next, three-lobed rubber cams; next, smooth steel trash rolls. The second series of kicker rolls embodies seven shafts carrying alternate rubber and steel star wheels. Dirt adhering to beets is "spanked off" by two sets of paddle shafts. The first carries four rubber paddles, while the second carries three groups of corrugated rubber flails.

The Marbeet Model 59E22 has a number of improvements, some of which are definitely aimed at better cleaning of the beets. The most effective of these is a kicker roll shaft which operates on the beets immediately after the tops are removed by the topping disks. These kicker rolls not only remove considerable adhering dirt, but also provide a positive feed for the beets into the transverse helical augur, and aid materially in the prevention of clogging. A total of 24 design modifications have been incorporated in the model 59E22 Marbeet Harvester. These include in addition to the cleaning features, stronger working components, increased use of high alloy steels on parts subjected to abrasion, and higher bearing capacities. A slip clutch on the augur roller drive shaft affords protection to the miter gears, and the topping disk swing frames and springs have been strengthened to permit the passage of larger beets, together with more accurate topping and more thorough cleaning.



*Farmland Photos.*

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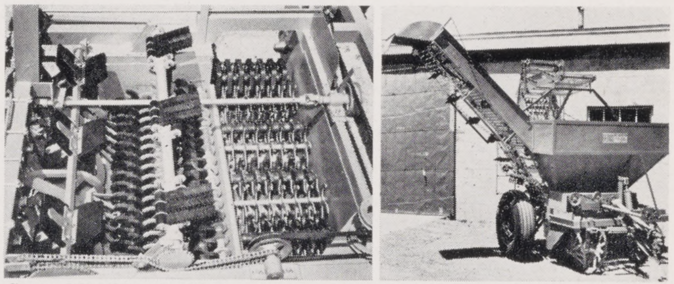
**TWO VIEWS** of the **FARMHAND** model "350" sugar beet harvester during field trials. Features are 7500 lb. tank capacity and hand-sorting cleaning table which can be used wnen clods are a problem.



*General Machine Co. Photos.*

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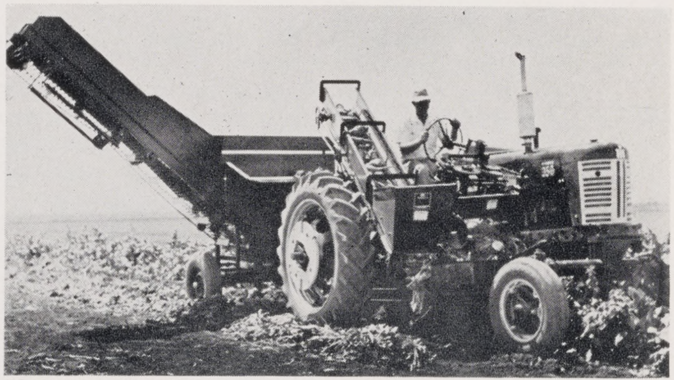
**THE GEMCO** harvester for 1959 has a much improved cleaning system, (left) and is available as a cart model when conditions are unfavorable to direct loading.



*Blackwelder Mfg. Co. Photo.*

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**THE MARBEET MODEL 59E22** embodies 24 design improvements directed toward lower maintenance and greater beet recovery. Beet cleaning is improved by a vertical kicker shaft wnich positively conveys beets away from topping disks.

# WE OFFER AN APOLOGY

IN COMPILING the 1958 Honor Roll which appeared in the last issue of the BULLETIN, one entry was omitted as a result of a clerical error. So we reproduce herewith the entry missing from the District 1 tabulation.

| Grower | Acres Harvested | Tons per Acre | Lbs. Sugar per Acre |
|---|---|---|---|
| W. W. Johnson & Sons | 64 | 31.82 | 9625 |

# SACRAMENTO AGRICULTURAL YARD MOVED TO WOODLAND

THE EFFICIENCY OF Spreckels' agricultural operations has been enhanced by moving the Sacramento agricultural yard to Ranch 21, adjacent to the Woodland factory.

The functions of the agricultural yard are to maintain farm implements for rental to growers, and to serve as headquarters to the travelling crews who maintain the rail and truck receiving stations in District 3 and that part of District 2 north of Manteca. By moving the yard headquarters to Woodland, these functions can be expedited, and the experimental agricultural farming operations on Ranch 21 (adjacent to the factory) can now be served with new convenience and effectiveness.

District Engineer John O. Neilsen, now has his office at Woodland, and will direct the beet receiving station maintenance from this point. His mechanical staff, in their improved shop, will devote more time to building and maintaining equipment for experimental use on Ranch 21, where an increasing proportion of the company's agronomic research is being allocated.

50

THE SACRAMENTO YARD shop building was dismantled on June 15 and loaded into trucks for transport to Woodland.

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AT WOODLAND the shop building was rebuilt and surrounding area graded for paving.

# SPRECKELS GROWER DEVELOPS EFFICIENT CULTIVATING SYSTEM

By DAN L. DIETER

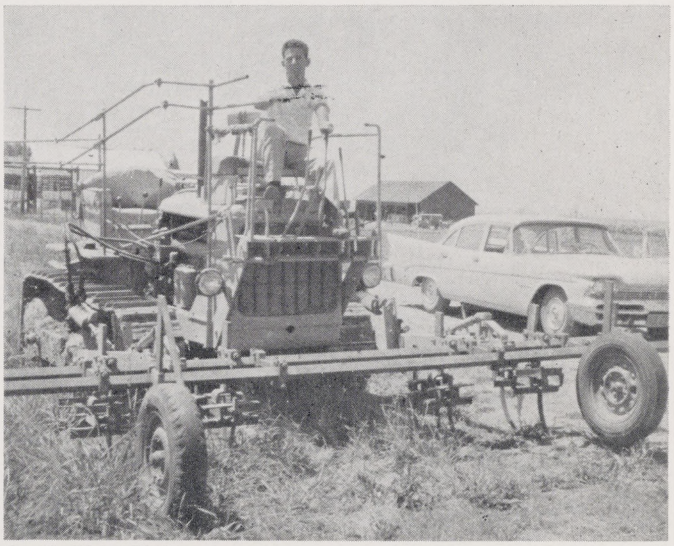
*Agricultural Superintendent*
*Spreckels Sugar Company*

THE NEED FOR reducing costs of production in sugar beets is ever increasing. Any means by which a grower can reduce his costs or obtain more efficient use of equipment means more profit per acre.

Joe Sanchez, well known beet grower in the Collegeville area, near Stockton, has developed a tool which has reduced his cultivation costs over one half. Joe took a standard gage Caterpillar D6 and equipped it with hydraulic bars fore and aft. He then mounted an operating seat directly over the radiator and installed a set of controls for the frictions and brakes at this point. The high front seat allows the operator to look directly down on the beet rows. Standard cultivating tools and gage wheels were then mounted on the front and back bars. It was found that, when the final "bugs" were ironed out of the machine one man could cultivate from 45 to 50 acres in a ten hour day. The machine and one operator practically replaced three men and three wheel tractors. The cost of converting the tractor controls and installation of the bars was slightly over $1000.

In conjunction with this machine, Joe developed a sled planter that planted six thirty inch rows at one time. This allows him to cultivate six rows at a time, which accounts for some of the capacity of the machine. Because of better visibility and ease of controlling the machine, the driver fatigue is less which accounts for still more efficiency. In addition to these two factors (because of the ease and sureness of control) the first cultivation can be done in third gear.

Joe states that he feels one cultivator of this type can handle 450 to 500 acres of beets in a season. In fact it handled over six hundred acres this year, with some supplementary help from one wheel tractor.


*Dan L. Dieter Photo* 52

JOE SANCHEZ at the controls of his D-7 which he equipped with front tool bars, hydraulic lift and front-mounted control center.

# COMMENTS ON A RECORD YIELD

By JAMES E. GARDINER
*Field Superintendent,*
*Spreckels Sugar Company*

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REX HUFF

TOPPING THE 1958 Honor Roll was the record 48.45 ton yield grown by Schuman farms on a 12 acre contract in the Pajaro Valley.

This 12 acres of sandy loam near the Pajaro River produced an average of 13,207 pounds of sugar per acre. In terms of consumer sugar, this yield amounts to 132 one-hundred pound bags per acre.

Mr. Rex Huff, Manager of Schuman Farms, while tremendously pleased at such fabulous yields, modestly declares himself at a loss to explain how or why it came about. However, exceeding the average of a rich farming area such as the Pajaro Valley by such an amount would indicate something more than sheer luck.

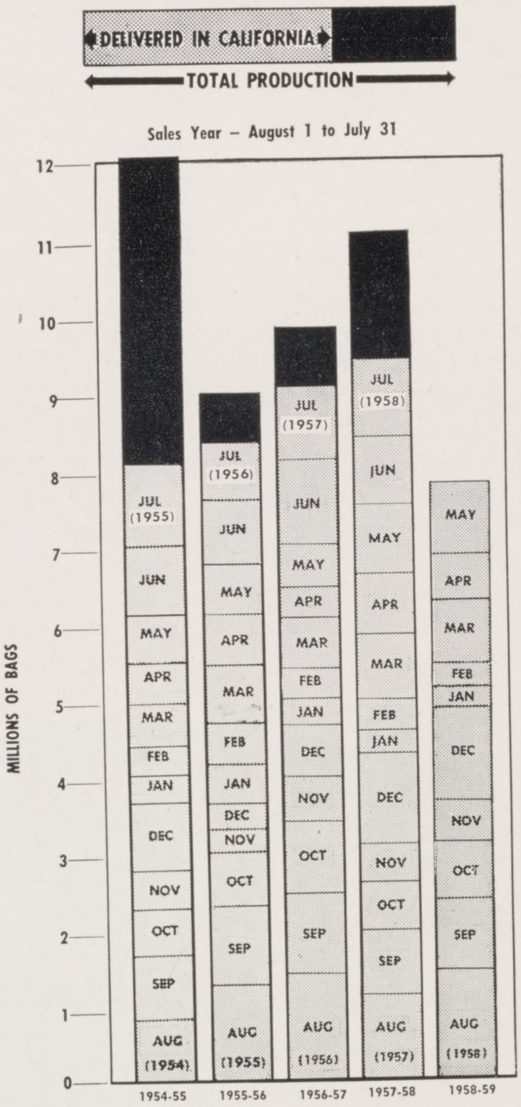
For the record, the field was planted in late January of 1958 following several successive years of lettuce production.

The field was pre-planted with 375 lbs. of 16-20, and side-dressed after thinning with 100 units of liquid nitrogen. Thus the crop received a total of 160 units of nitrogen, plus whatever residual nitrogen remained from previous lettuce crops. Thinning on this field was quite timely, with a resultant stand of 130 beets in 100 feet of row.

Beets were exceptionally long (some beets measured 40″ in length), but rather less than average in diameter. Harvesting these big beets was a challenge, and demanded expert supervision.

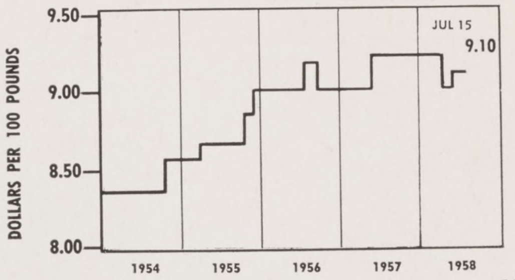
The armchair quarterbacks can mull the whys and wherefores for months to come, but whatever the reason, congratulations are certainly in order for the personnel of Schuman Farms.

## PRODUCTION AND DELIVERIES OF BEET SUGAR IN CALIFORNIA



## QUOTED PRICE OF BEET GRANULATED SUGAR

In 100 Lb. Paper Bags, F.O.B. San Francisco



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The SPRECKELS SUGAR BEET BULLETIN is issued bi-monthly by the Agricultural Department of the Spreckels Sugar Company as a service to its growers.
Mention of specific methods, devices and implements does not constitute an endorsement by the Company.
All photographs by the editor unless otherwise indicated.

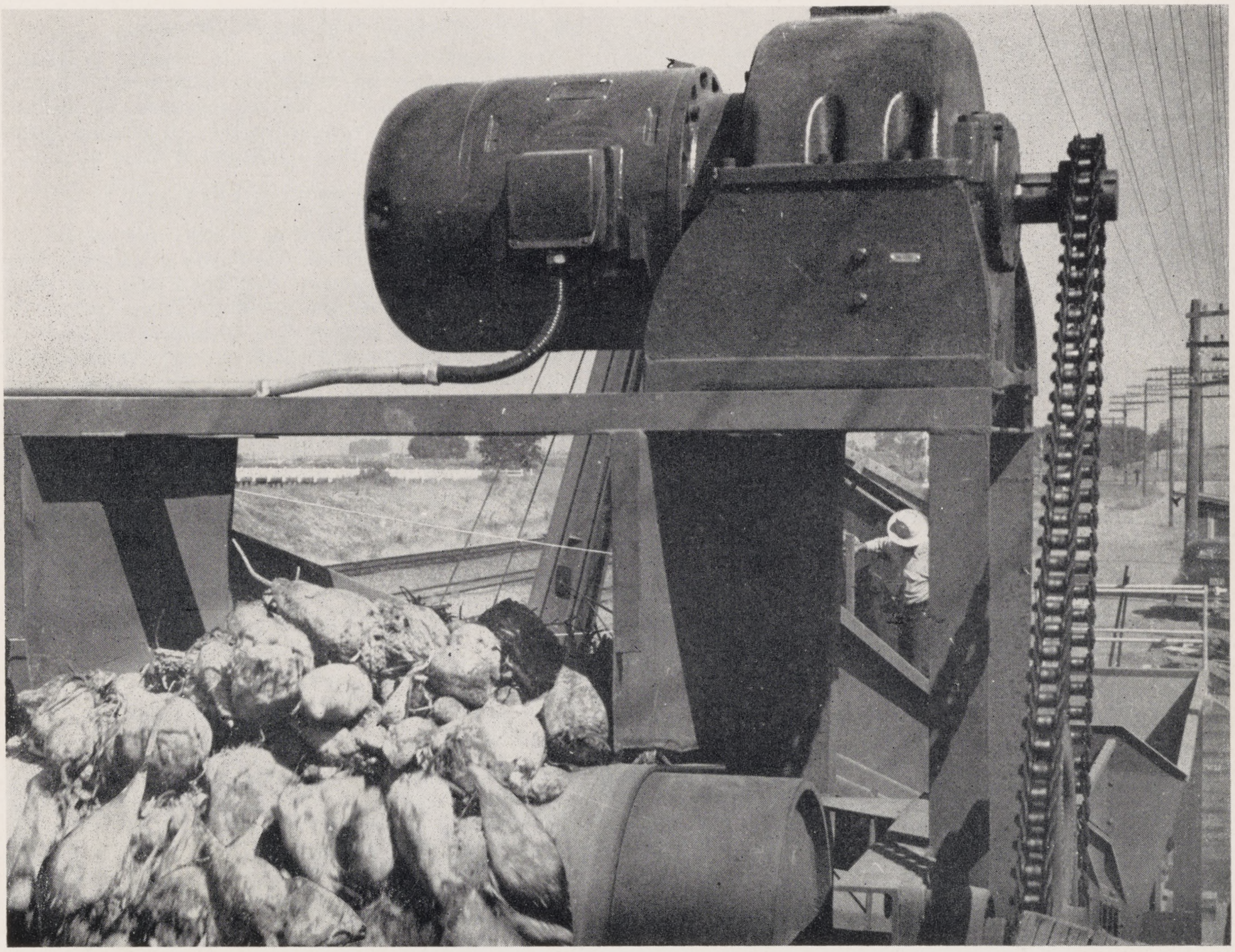
AUSTIN ARMER, EDITOR
SPRECKELS SUGAR COMPANY
WOODLAND, CALIFORNIA

SEP 25 '59

PUBLISHED FOR CALIFORNIA SUGAR BEET GROWERS BY THE SPRECKELS SUGAR COMPANY

# SPRECKELS SUGAR BEET BULLETIN

VOL. 23 SEPTEMBER-OCTOBER, 1959 NO. 5



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## *RECEIVING STATION IMPROVEMENTS*

**are a part of Spreckels Sugar Company's modernization program aimed at:**

**GREATER BEET CAPACITY**
**BETTER HARVEST SCHEDULE**
**HIGHER GROWER RETURN**

**New equipment in factory and field speeds beet processing—see page 34.**

# NEW EQUIPMENT IN FACTORY AND FIELD SPEEDS BEET PROCESSING

THE COST-PRICE squeeze, in which growers and processors both find themselves, finds its solution mainly in the reduction of costs. This reduction, in our modern age of technology, is brought about principally by the purchase of new and improved mechanical equipment.

In keeping with this philosophy, Spreckels Sugar Company has invested $1,500,000 over the past year in equipment both for receiving beets and for processing beets.

The new facilities for beet receiving were described in some detail in the last issue of the Spreckels Sugar Beet Bulletin. These include three completely new receiving stations, located at Swingle, Comstock and Guadalupe. These three new stations incorporate the multi-roll screen developed by the Spreckels Sugar Company Agricultural Engineering Department. These screens are now in service at 16 receiving stations including the three factory stations. We would like to emphasize the importance of these new screens in speeding up beet receiving. Not only do they remove a far greater proportion of trash and soil from beets than their predecessors (at the same time damaging the beets less), but they also are virtually plug-proof. The time previously lost in cleaning out screens under distressing conditions of mud and trash has been reduced to the vanishing point.

Another important feature of the Spreckels-designed receiving stations is the beet receiving hopper, as exemplified by the Del Paso and Comstock stations. These receiving hoppers are so constructed as to present a very uniform discharge rate to the beets as they are carried over the screen. This permits the screen to operate at maximum efficiency at all times and prevents momentary overloads such as was frequently encountered with the older designs.

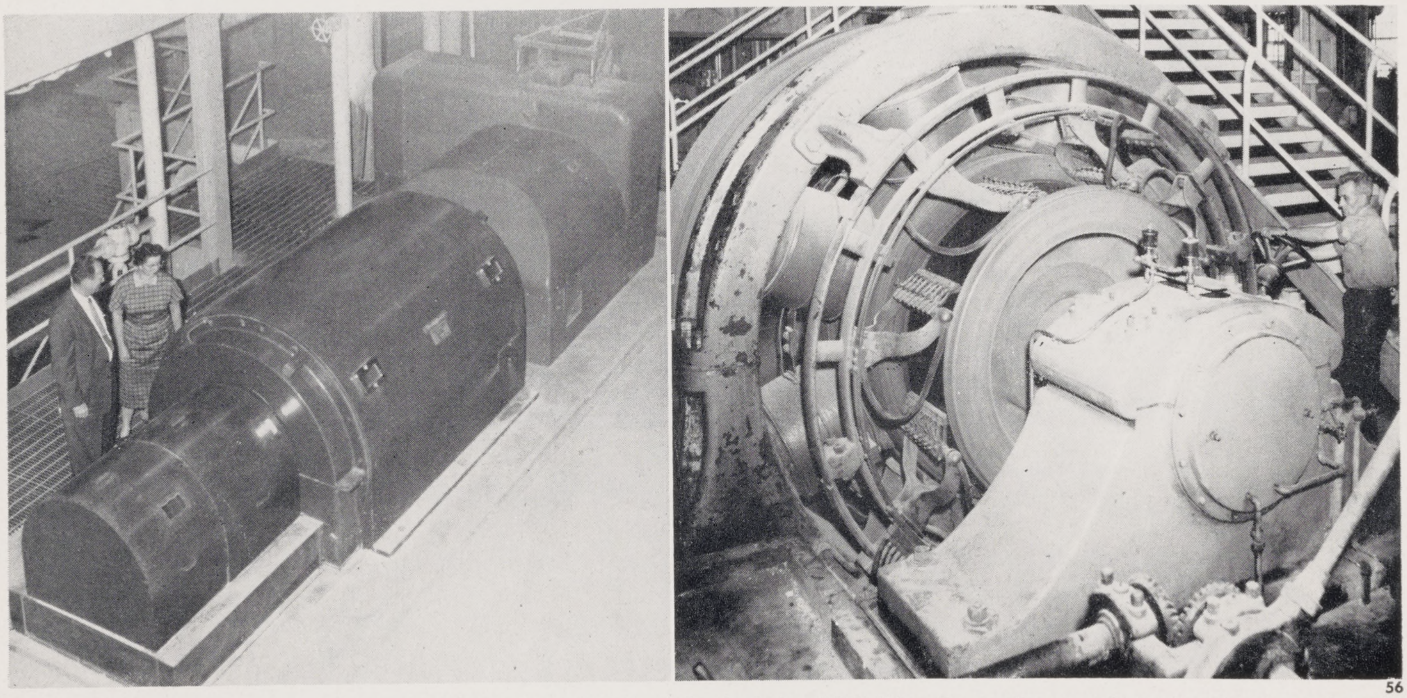
### ALL PULP IS NOW DRIED PULP

Since 1917, Factory 1 at Spreckels has dried its beet pulp. The virtues of molasses dried beet pulp are discussed elsewhere in this issue, and it is not surprising that the company's modernization program has included conversion of both Factory 2 and Factory 3 to the production of molasses dried beet pulp.

The latest addition to the pulp drying equipment is the entirely new installation at Factory 2, Manteca. This embodies a battery of pulp presses, a gas-fired drum dryer, a cooler, and finally a dried pulp warehouse capable of holding 4500 tons of dried pulp.

### MORE POWER FOR FACTORY 1

A major capital addition at Factory 1, Spreckels, is the new five thousand KVA Turbo generator. This electrical modernization at Factory 1 has some very interesting historical background. When originally built in 1897, this factory was an innovation because of the large amount of electric power generated and used for driving the various mechanical loads. Four cumbersome direct current generators, as illustrated, supplied the electrical power requirements of this original factory installation. The tremendous size of these old multi-polar D.C. generators, with the reciprocating steam engines which drove them, is in sharp contrast to the compactness of the new turbo generator.



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LEFT—A new turbo-generator has been installed at Factory 1, Spreckels. Producing 5,000 Kilowatts at unity power factor, its output is ten times the power generated by the old monster on the right. Built in 1897, this D. C. generator still produces 2000 amperes at 250 volts.

# ENTIRE SPRECKELS BEET PULP OUTPUT IS NOW DRIED

By S. L. STOVALL

*Livestock Specialist, Spreckels Sugar Company*

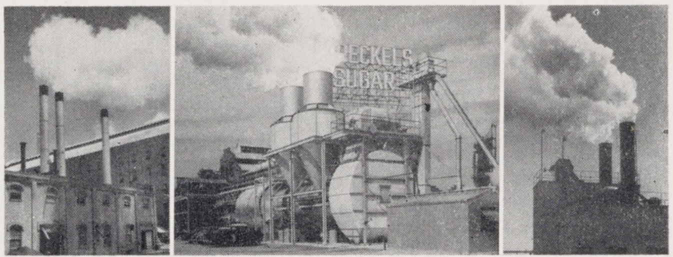
WITH THE OPENING of the 1959 fall campaign, Spreckels Sugar Company became the first multi-factory sugar processor in the country capable of drying its entire output of beet pulp. This came about through completion of the drier installation at the company's Manteca factory.

These facilities include pulp presses, drier, cooler, and pulp warehouse, representing an expenditure of over $500,000. They will produce approximately 150 tons of molasses dried pulp a day.

This will mark the discontinuance of the supply of wet beet pulp at Manteca, and necessitates a change in the feeding pattern of many of the area's dairymen as well as the cattle feed yards at this factory. Recent developments in nutrition which favor a more concentrated ration make this a desirable change. The end of storing wet pulp in an open silo will also eliminate the odor arising from the curing of this material.

The pulp produced by Spreckels is made by adding molasses to the cossettes after they have passed through the diffuser, and dehydrating the mixture. The dried pulp is then either shipped or stored in the form called regular bulk pulp. A part of the pulp is bagged in 50 lb. paper or 100 lb. burlap bags. Spreckels also offers a pellet-crumble which is made by passing our regular pulp through a pellet mill. Recent trends in feed handling have greatly increased the use of both regular and pelleted pulp, while bagged pulp use has declined. This follows the pattern set in most all business where increased mechanization has occurred in order to reduce costs.

This new production will find a ready market in California's ever-expanding dairy and beef fattening industries. Feeders recognize beet pulp as a valuable addition to their rations where it is used to add variety, palatability and needed bulk to cattle feeds.



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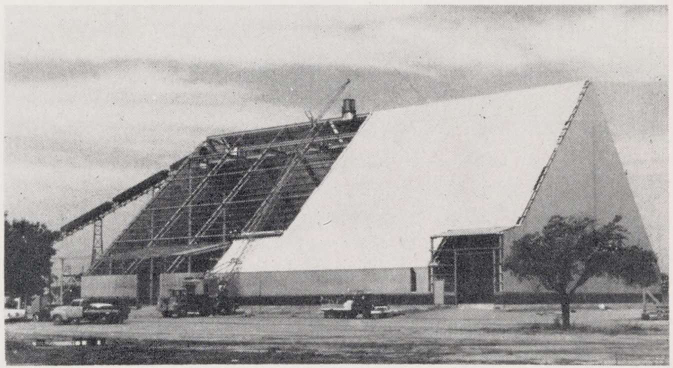
**SPRECKELS, 1917** **MANTECA, 1959** **WOODLAND, 1952**

**ALL THREE Spreckels Sugar Company factories now have pulp drying facilities, putting an end to the odor nuisance of siloed wet pulp, and providing a more desirable feed concentrate.**



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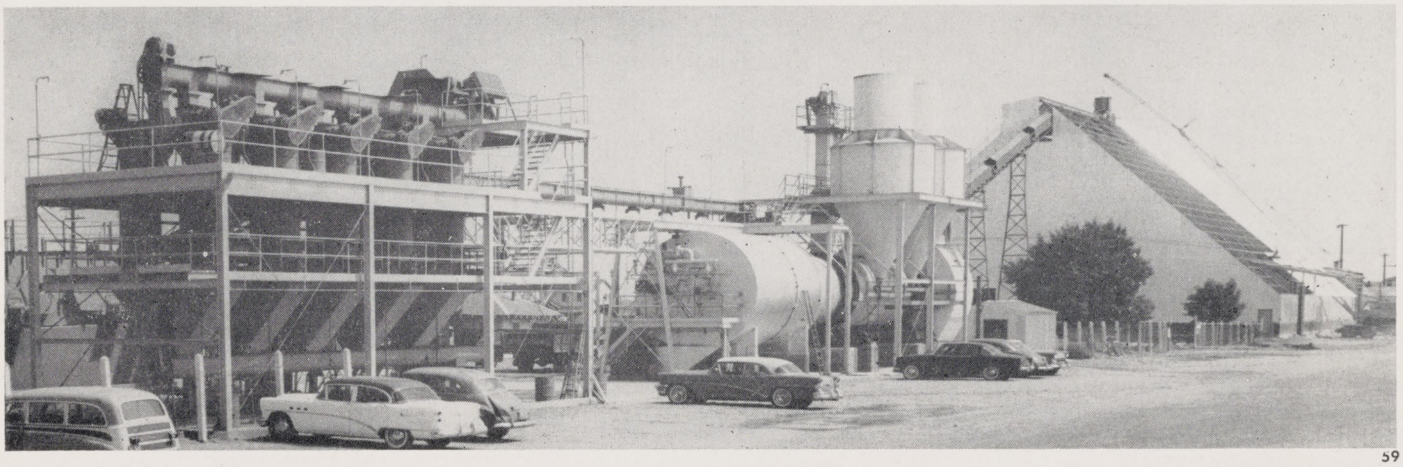
**THE PULP WAREHOUSE at Manteca (photographed before completion) has a capacity of 4500 tons of dried pulp in bulk.**

By the traditional "Total Digestible Nutrient" method of comparison, beet pulp does not quite equal the feeding value of barley. However, it has been found that beet pulp can effectively replace up to 50 percent of the grain in a ration. This is due to the fact that the fiber content of pulp, which is relatively high compared with other concentrates, is highly digestible. Thus an animal wastes less energy in digesting pulp and, conversely, has more energy available for the production of milk or meat.

New insight into feeding standards has made the "net energy" method of measuring feeds more acceptable. By this method the loss of energy in digestion is taken into account. On a net energy basis, beet



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**AT MANTECA, the new dried pulp facility includes 5 pulp presses, a gas-fired drum drier, a cooler and a warehouse for bulk molasses dried beet pulp.**

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**MOLASSES DRIED** beet pulp is produced in regular form (left) or as pellets (right). Both forms are available either in bags or in bulk.

pulp is fully equal to barley for both beef and dairy cattle.

In addition to its energy value, beet pulp possesses certain physical characteristics which further enhance its value. Pulp can add needed bulk to a ration without reducing the energy value of the ration. This is not true of other bulk feeds such as straw, hay or cottonseed hulls. Further, it increases the palatability of a ration due to its flavor. Thus cattle can be kept on feed easier when their ration contains beet pulp. The value of pulp in dairy, beef and lamb feeding is more fully discussed in a booklet entitled "Facts About Molasses Dried Beet Pulp." This booklet is available at any Spreckels Sugar Company office.

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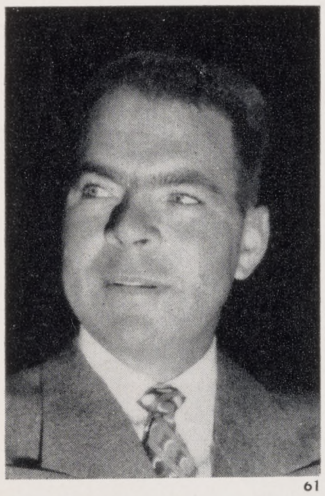
# *Notes from Our Field Men*

## HAROLD VOTH — SPRECKELS



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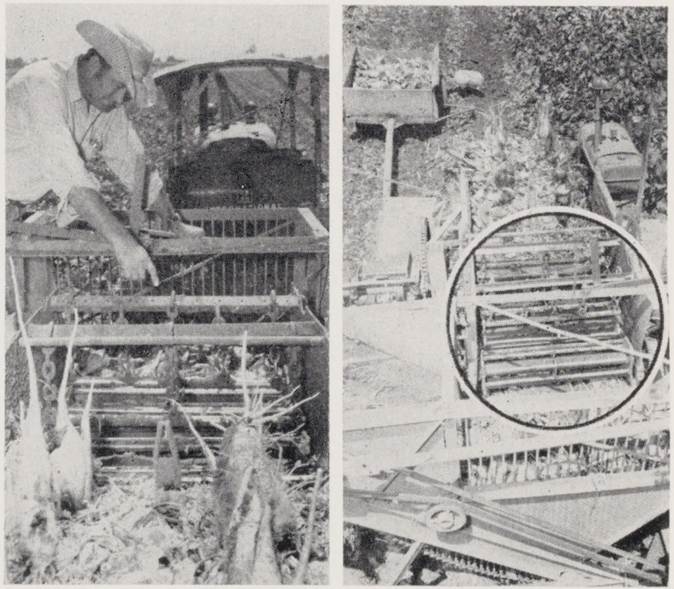
The importance of delivering clean beets from growers' fields is appreciated by a commercial harvester, Buck Renfro.

Buck has made an important improvement on his two-row Marbeet harvester, and has, in fact, custom-built a number of additional units for other growers and contractors. The improved cleaning of Buck's harvester is due to his having replaced the earlier kicker wheels with a series of squirrel cage drums. These are on the same shafts and driven at the same speed as the original kicker rolls, but are very much more effective in removing dirt and trash.

The photographs show the manner in which these squirrel cage cleaning rotors are installed, and also indicate the trailing gleaning cart which is one more example of the efforts put forth by this commercial harvester to do the best possible job for his clients. The photographs were taken on the Ambrosini and Pisoni contract near Gonzales. The 36 ton yield in this field was a challenge to any harvester, but Buck Renfro's machine handled it very nicely, delivering well topped, well cleaned beets.



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**BUCK RENFRO** (right) points to the squirrel cage rotors which he built to replace the kicker rolls on his 2-row Marbeet harvester. At right, they are seen in the circle—this photo also shows the gleaning trailer.

# THE BEET GROWERS' SHARE OF THE CONSUMER'S DOLLAR

HOW MANY CENTS of each dollar spent by the housewife for sugar does the farmer receive? And how does this compare with the share he receives of each dollar spent in retail grocery stores for other foodstuffs?

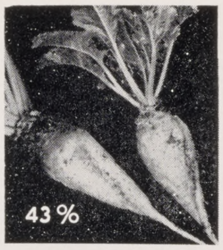
With almost 300 crops raised commercially in California, it is impossible to develop this comparison in full detail in these pages. But data published by the U. S. Department of Agriculture in April of this year show that sugar beets yield a higher percentage of the consumer's food dollar to California growers than any of the food or fiber crops that are commonly rotated with them. Thus:

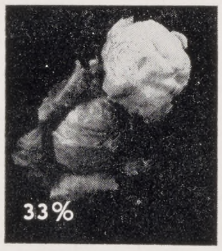
Farmer's Share of Retail Cost, January-March, 1959*

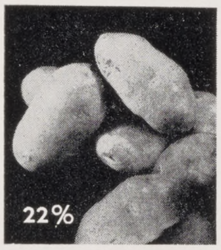
| Foodstuff or Fiber | Farmer's % of Retail Cost |
|---|---|
| SUGAR BEETS** | 43 |
| Tomatoes (fresh) | 40 |
| Beans, dry | 37 |
| Lettuce | 33 |
| Strawberries, frozen | 23 |
| Cabbage | 22 |
| Potatoes | 22 |
| Celery | 21 |
| Carrots | 19 |
| Green beans (frozen) | 19 |
| Peas (frozen) | 16 |
| Tomatoes (canned) | 15 |
| Peas (canned) | 14 |
| Cotton (apparel & household goods) | 14 |
| All fruits and vegetables | 29 |
| Fats and oils | 25 |
| Bakery and cereal (all ingredients) | 17 |
| Miscellaneous products | 16 |

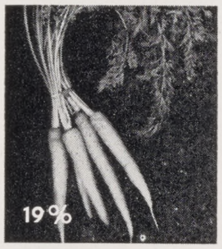
Of the approximately 50 individual products cited in the U. S. Department of Agriculture study, butter returned the highest share of the retail cost to the farmer (69%), corn syrup, the least (11%). The only categories higher than sugar beets were poultry, eggs, meat and dairy products.

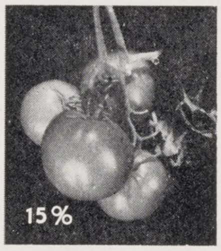
Economic factors too numerous and complex to be recited here account for the wide spread between the farmer's share of the retail cost of poultry and eggs and of bakery and cereal products, and of butter and of corn syrup. But the comparisons at least show that sugar beet growers receive a *relatively* high percentage of the sugar user's dollar and that the processing and marketing sugar functions receive a remarkably low percentage of that dollar. This low percentage is particularly noteworthy when one considers the complexity of processing sugar beets into sparkling crystals of sugar, attractively packaged, and placed on every neighborhood grocer's shelf.

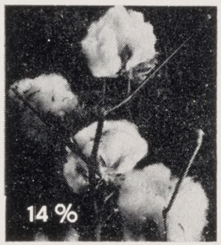












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One reason, of course, is that the sugar beet grower participates in the price the processor receives for sugar. Over the past few years as the net return from sugar sales has increased, Spreckels Sugar Company beet growers have received, in accordance with the provisions of their contracts, over half the margin of this increase.

Yet this relatively generous share of the sugar consumer's dollar that winds up in the beet grower's pocket does not of itself assure him of a handsome net profit from his crop. For this share represents only his income from sugar beets. His costs of growing them must be deducted to arrive at his net profit. Two avenues lead to increased profit from sugar beets.

First, the grower can reduce costs by careful and efficient farming practices. Proper planting of the most advanced seed varieties, timely and proper applications of fertilizer and water, and greater mechanization of field operations—all have saved California growers money and thus have given them higher profits from beets. But although this state's growers have a fine record in seeking out and adopting methods that reduce the cost of raising beets, no participant in the agriculture sector of the American economy can afford to rest content with past achievements. The search for improved operating techniques in the field as in the factory is an endless one, and the Spreckels Sugar Company dedicates its Operating and Agricultural Department research facilities toward this end.

Second, a high price received by the grower for his beets will obviously increase his profit. Such a price depends in part on the grower producing beets of high sugar content, since it is essentially sugar and not his beets that the processor is purchasing. To the extent that the grower can control sugar content by sound cultural practices he can assure himself of a higher profit from each acre of beets. A high price for beets also depends on high nets earned by the processor from its sale of sugar. As has been noted here before, Spreckels, and its California growers, have favorable prospects for better nets because of the expected rapid growth of population and sugar-using industries in the profitable home market of the Pacific Coast, particularly California. So the outlook for sugar beet prices is good. If this is matched by constant attention to cost cutting in the field, and if the grower continues, as he should, to receive about his present share of the consumer's sugar dollar, the financial attractiveness of growing beets will rise significantly in the years ahead.

In the same U. S. Department of Agriculture publication from which the comparisons made earlier in this piece were taken is a

*(Continued on Page 40)*

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*Source: Agricultural Marketing Service, U. S. Department of Agricultural "The Marketing and Transportation Situation," April, 1959, pp. 18 and 42.

**Includes government payment.

# AGRICULTURAL DEPARTMENT HAS SPECIAL SERVICES STAFF

SUGAR BEET GROWERS are acquainted with the Spreckels Sugar Company mainly through the field superintendents—the men who conduct the day-to-day business relations between the Company and its growers. There is, however, another group of experts whose duties do not permit them to contact the growers so frequently, but whose activities are a very important part of the services offered by the Agricultural Department. These men constitute the Special Services Staff. We would like to introduce them, and tell something of their work.

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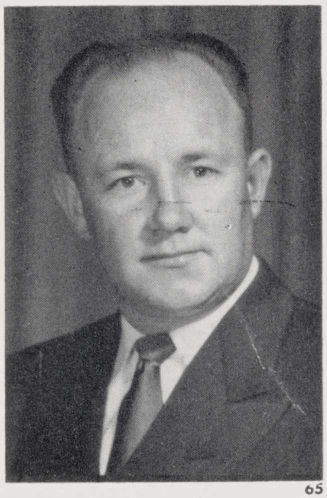
DR. RUSSELL T. JOHNSON, Director of Agricultural Research, is in overall charge of the Spreckels plant breeding program, all agronomic studies bearing on variety improvement, and all research connected with new materials and methods for pest control, fertilizing and irrigating. His headquarters are at Spreckels, where his office overlooks a group of greenhouses and the fields of Spreckels Ranch 1, which are in constant use as experimental plots.

Dr. Johnson's principal activity as plant breeder involves the many complex studies connected with the production of new varieties of beet seed, tailored to meet the needs of each locality which the Spreckels Sugar Company contracts beet acreage. Dr. Johnson also supervises the growing of sugar beet seed by the West Coast Beet Seed Company in Salem, Oregon, as well as at Hemet and Tehachapi, California.


65

GEORGE WHEATLEY, Agronomist, assists Dr. Johnson in the Spreckels district. George is in charge of all sugar beet seed processing. In addition, he supervises a tremendous number of variety trials in field plots, both on the Spreckels ranches and on cooperating growers' land.

George is especially well versed in the techniques of plant breeding, and as a consequence, he does much of actual experimental work connected with Dr. Johnson's program.

66

DR. VARON JENSEN, Plant Physiologist, conducts a highly specialized and very important part of Dr. Johnson's variety improvement program. Varon's work is a long range study of the basic characteristics of the sugar beet as a source of sugar. His work involves deeply probing investigations of the mechanism of sugar formation and of the origin of impurities, and their influence on processing. His findings are closely correlated to the breeding of improved sugar beet varieties, and are directed toward the ultimate improvement in sugar content and purity.

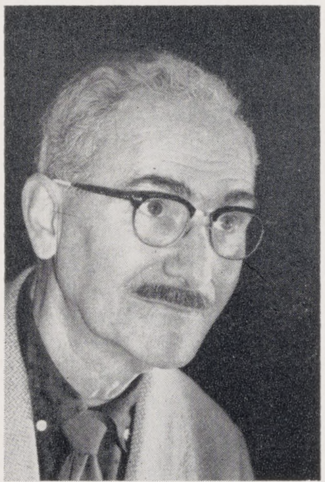
67

LAUREN BURTCH, Agronomist, carries on the agronomic research in District II and III. In addition, he carries on an elaborate program of field experimental work involving the testing of insecticides, fungicides, and nemetacides. His plot work also includes fertilizer and irrigation tests, and yield trials involving almost every conceivable new cultural method relating to fertilizing, irrigating, cultivating, thinning, etc. His headquarters are at Woodland, but his work takes him wherever beets are grown.

68

LOYD STOVALL is the Company's Livestock Specialist. His headquarters are at the Two Pine Street office of the company, but his heart is on the range and his mind on cattle feeding.

Loyd's job is basically the management of pulp sales. However, this is a pretty broad field, since it involves a determination of how much pulp shall be converted into pellets and how the dried pulp in its various forms can be most economically used in bulk by large feeders. On this latter subject, Loyd has helped some very large scale feeders to develop full automation of their feeding operations.

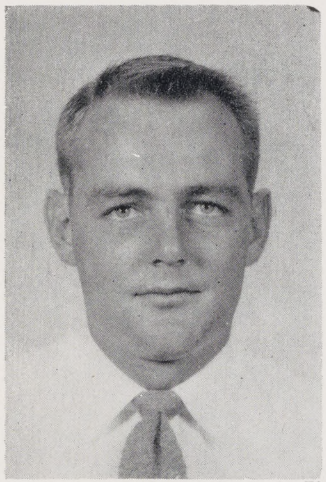


69

AUSTIN ARMER bears the title Agricultural Engineer, but his duties are far too numerous to be adequately described by this title.

Those activities which are directly connected with agricultural engineering relate principally to the design and construction of beet receiving equipment, although his earlier work will be recalled as dealing with the improvements in design of harvesting and thinning machinery.

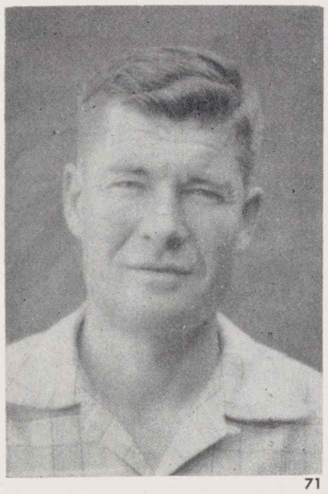
Austin's non-engineering activities include the editorship of the Spreckels Sugar Bulletin and the agricultural department's photographic program. This includes not only the necessary illustrations for the Sugar Beet Bulletin, but has also involved a series of motion pictures in sound and color, which he has himself produced complete with narration.



70

TOM RYAN is District Engineer in District I, Spreckels, although his activities take him to the southern San Joaquin Valley as well.

Tom's job is to supervise the construction and operation of all receiving stations in the Salinas Valley and in the San Joaquin Valley from Crows Landing south to and including Conner. Tom's crew includes an electrician, two welders, minor mechanics and laborers.



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JOHN NEILSEN is District Engineer in Districts II and III. His duties are parallel to those of Tom Ryan, but include the receiving stations from Manteca north to and including Grimes. John's headquarters are at the Woodland factory. Recently his headquarters were moved from Sacramento, where the implement maintenance yard had been in existence since 1925. John's crew numbers 12 in all, and includes an electrician, two welders, mechanics and laborers.

A portion of both District Engineers' duties is the operating and servicing of the sample trucks which make the rounds of the receiving stations at night to pick up the samples for analysis at the factory Tare Laboratories.

All of the members of the Special Services Staff have many interests in common, but one in particular—the practical application of sugar beet technology. Most of them are members of the American Society of Sugar Beet Technologists. Austin Armer was president of the Society in 1956 and 1957, and Dr. Johnson is currently Chairman of the Society's Genetics and Variety Improvement Section.

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## *Notes from Our Field Men*

### HARVEY PARKER — KING CITY

72

One of my growers, Jack Hayes, has worked out a new trash conveyor on his Marbeet harvester which works very well.

He has installed a series of 5 squirrel cage rollers in place of the foliage belt (or potato chain). At the last report, the machine worked all season in 1958 and to date in 1959, with no lost time due to plugging of tops on the new foliage conveyor — and some of going was pretty tough, especially after last year's rains.

## WE APPRECIATE YOUR EFFORTS

**Over the past few months, we have stressed the importance of delivering clean beets to our factories. The response to these pleas has been most rewarding. There has been a marked improvement in the quality of beets delivered to our factory and outside receiving stations, especially with regard to the accuracy of topping and freedom from trash.**

# BEET GROWERS SHARE

*(Continued from Page 37)*

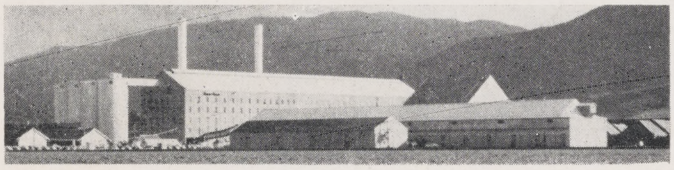
table comparing the net incomes of various kinds of food processors as a percentage of net assets (net worth). Part of this table is reproduced:

**Net Income of Leading Corporations Marketing Agricultural Products**

| Category | After-tax Income as % of Net Assets 1957 | 1958 |
|---|---|---|
| Baking | 12.5 | 11.5 |
| Dairy Products | 11.9 | 11.8 |
| Sugar | 9.0 | 6.1 |
| Meat Packing | 4.2 | 4.4 |
| Other | 11.5 | 11.4 |

Sugar, along with meat packing, is, as you can see, far behind the rest of the parade, and dropped sharply from 1957 to 1958.

These figures point up two other important matters. First, and contrary to what many people believe, there are no excessive profits accruing to so-called "middlemen" in the food industry; certainly not in sugar. Those who perform the processing and marketing functions contribute essential and valuable services for relatively modest compensation. Second, with low profit margins, sugar processors must carry on their business as efficiently as possible. This means that their processing equipment must be modern and well maintained and that their factories must be run as long and as close to capacity as possible. So we at Spreckels share with our growers an interest in technological improvement — the ultimate in performance from machines and methods.



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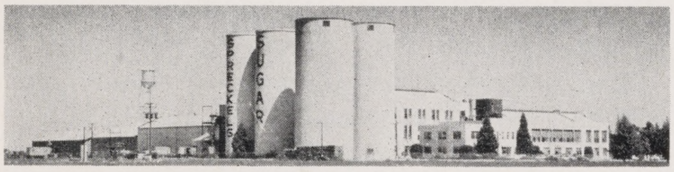

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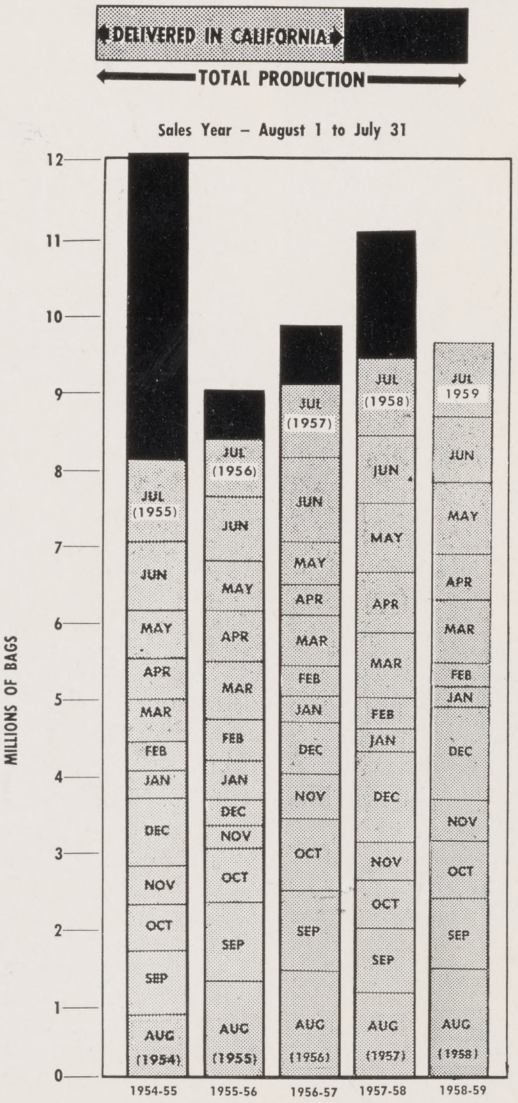
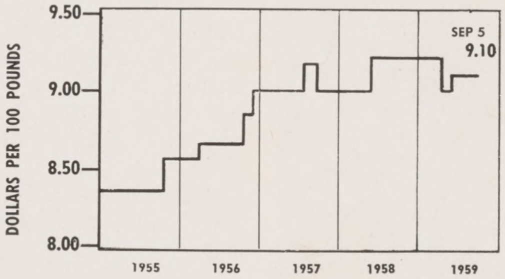
## PRODUCTION AND DELIVERIES OF BEET SUGAR IN CALIFORNIA



## QUOTED PRICE OF BEET GRANULATED SUGAR

In 100 Lb. Paper Bags, F.O.B. San Francisco



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The SPRECKELS SUGAR BEET BULLETIN is issued bi-monthly by the Agricultural Department of the Spreckels Sugar Company as a service to its growers.
Mention of specific methods, devices and implements does not constitute an endorsement by the Company.
All photographs by the editor unless otherwise indicated.

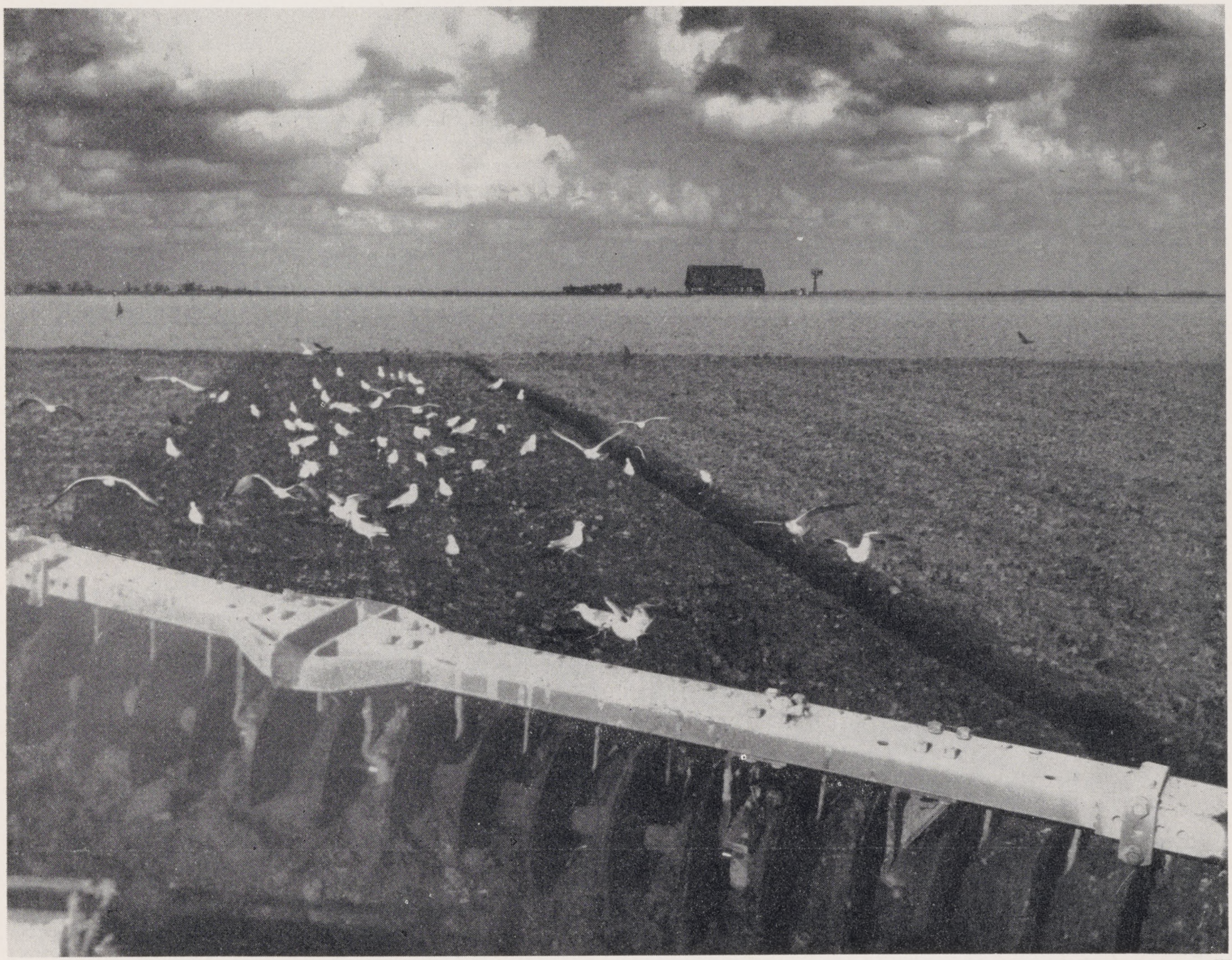
AUSTIN ARMER, EDITOR
SPRECKELS SUGAR COMPANY
WOODLAND, CALIFORNIA

PUBLISHED FOR CALIFORNIA SUGAR BEET GROWERS BY THE SPRECKELS SUGAR COMPANY

# SPRECKELS SUGAR BEET BULLETIN

DEC 28 '59

VOL. 23 NOVEMBER-DECEMBER, 1959 NO. 6



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## LAND PREPARATION

Marks the first step in growing a weed-free crop of sugar beets

PLANTING

THINNING

CULTIVATING

can all be part of a weed control program using chemical and mechanical aids. See page 42.

# WHAT ARE THE TRENDS IN WEED CONTROL?

*By* LAUREN BURTCH, *Agronomist*
*Spreckels Sugar Company*

UNTIL RECENTLY, weed control in sugar beets was limited to only two tools—the cultivator and the hoe. Neither of these time-proven tools has been made obsolete by recent developments of chemical and mechanical methods in sugar beet weed control. But these new developments do provide keys to open some of the doors which lead to complete elimination of hand labor in sugar beets.

While the purpose of this article is to discuss briefly the keys which are now available to us, we should first answer the question "how much is a clean field of beets at harvest worth in terms of yield?"

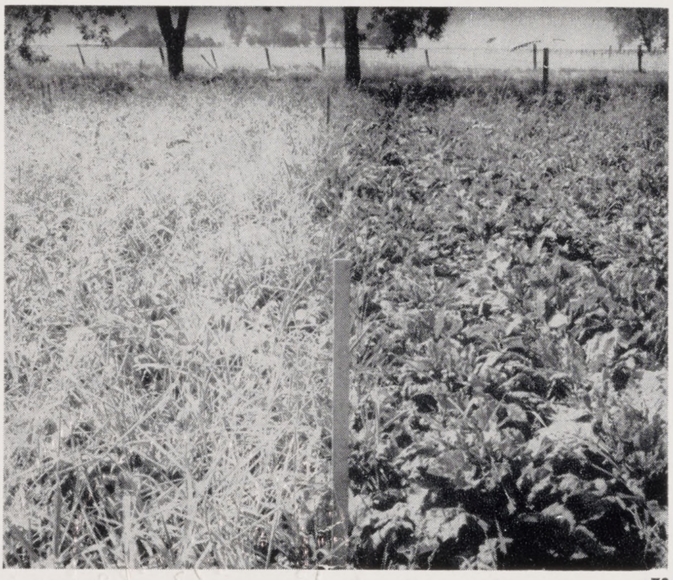
Since watergrass is the most important economic weed in most of the beet areas in California, most of our available yield data was obtained under watergrass conditions. The yield figures in Table I illustrate actual yields lost to watergrass under four typical watergrass situations. In each location, the actual field practice used by the grower served a check against keeping the field completely clean by hoeing. Each experiment was replicated 5 or 6 times, and the hoeing costs represent time spent in cleaning watergrass from the beet rows.

TABLE I

Yield comparisons under various watergrass conditions in the Central Valley of California. Each experiment compares hand hoeing with field practice.

| | | Yields in Tons Per Acre | | | | |
|---|---|---|---|---|---|---|
| Location | Watergrass Condition | Field Practice* | Hoeing (Once) | Hoeing (Twice) | Hoeing (3 Times) | Hoeing Cost |
| Tracy | Light | 17.4 | 19.3 | ...... | ...... | $ 7.00 |
| Yuba City | Moderate | 19.9 | 26.2 | ...... | ...... | 20.00 |
| Firebaugh | Severe | 16.3 | ...... | ...... | 28.4 | 90.00 |
| Davis | Severe | 3.2 | 14.3 | 17.6 | ...... | 50.00** |
| AVERAGE | | 14.2 | 22.5 | | | $42.00 |

* Same treatment grower used in remainder of field.
** Average of both hoeing treatments.



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WATER GRASS (left) persists despite a good hoeing and cultivating program. Complete eradication (right) calls for repeated hoeing at high cost. But complete chemical control will become possible as present materials and methods are perfected.

The average difference in yield (8 tons) probably is a good figure to use in estimating the cost of watergrass in actual yield. The $42 average hoeing cost is too high to be economically practical, but watergrass control is both necessary and essential to maximum yields and delivery of clean beets to receiving stations. How then do we obtain this control without the use of hand labor and cash—two items in short supply?

## POST EMERGENCE WEED CONTROL

The most desirable approach to weed control would be to wait until the problem develops and then quickly and cheaply solve it. Unfortunately, this is not possible by any chemical or tool yet available. There are, however, chemicals and tools which can help.

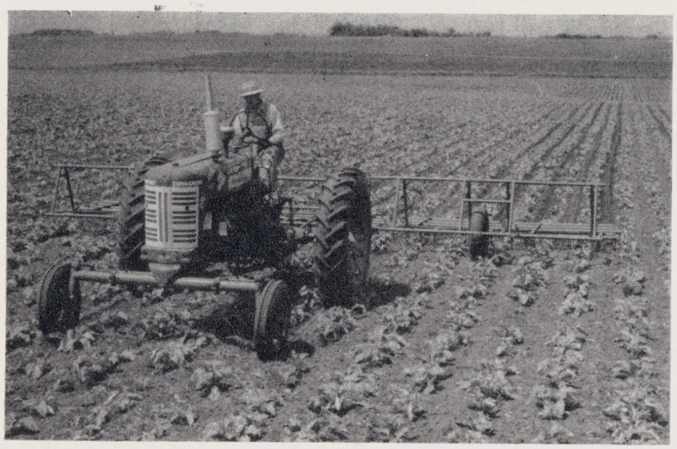
Dalapon, for example, has saved a number of fields from disking-up and replanting by holding annual grasses in check until mechanical and hand methods could be brought in to action. On late season post thinning watergrass, however, Dalapon has failed, partly because of failure to reach and kill the several stages of watergrass that are always present in mid-season, and partly because of the depressing influence on beet yield.

Perhaps the most encouraging developments on post-emergence weed control have been mechanical. First in importance is good modern cultivation equipment. I'm sure most beet growers will agree that they could improve their weed control programs with more frequent and closer cultivation, repeated later in the season. Also obtaining and holding good stands of beets in the row is a real asset in keeping fields clean. The sled cultivators recently introduced in California beet fields have replaced much of the hard work and skill needed for early close cultivation.

Another recent mechanical innovation is the flexible tooth harrow. Three of these harrows are commercially available—the Melroe, the Noble and the Kovar. This tool is old in principal. It was first used in the corn belt states for seedling weed control. The use in sugar beets is quite new, but widely and enthusiastically accepted by growers in the Nampa, Idaho and Nyssa, Oregon districts. Reports from this high production area (about 28 tons average last year) are most enthusiastic. In an area where 20 acre contracts are average, growers are purchasing and using harrows for sugar beets and other crops as well. In this area, the harrow has had better grower acceptance than machine thinning or chemical weed control.

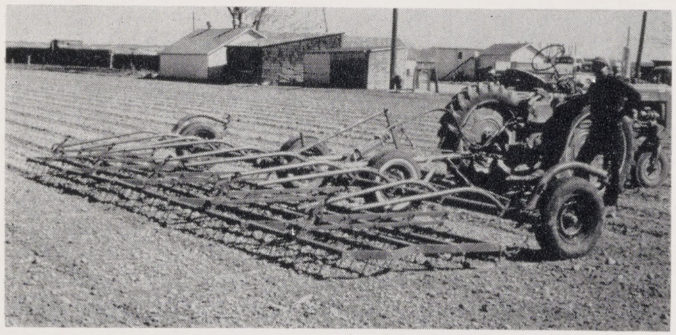
The operation could be thought of as one of faith. The grower assumes his beet field will have weeds and then he harrows them repeatedly, from pre-emergence through post-thinning, changing directions each time. The success of the harrow depends on timing—both from the standpoint of weed size and soil condition. Since the equipment covers such a large area per pass, large acreages can be covered in a short time.

Some sections of California should welcome a tool of this type immediately, and it is worthy of considera-



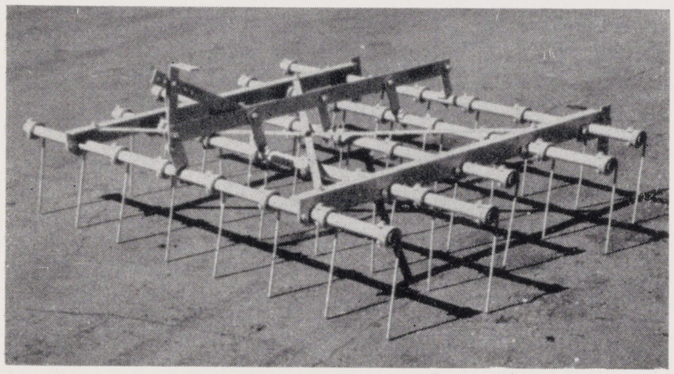
*Farmhand Mfg. Co. Photo* 79

THE MELROE Harrow is distributed by The Farmhand Company. It has been effectively used by beet growers in North Dakota and other beet growing states.



*Amalgamated Sugar Co. Photo* 80

THE NOBLE Spring Tine Harrow offers one type of mechanical weed control which has achieved great success in Idaho and Oregon sugar beet fields.



*Kovar Mfg. Co. Photo* 81

THE KOVAR Harrow was developed for the corn belt, but is finding a growing acceptance in sugar beets. One section is shown above.

tion for all beet growing areas. Even where fairly high beds are used, these harrows will work.

For control of small weeds in larger beets (especially small watergrass), the Sinner weeder attachment or a homemade modification can do a fine job. This is a thin flexible curved cultivator knife which snaps in and out between established beets down the row. This tool has a tendency to throw some soil around the beet crowns, smothering some weeds as well as cutting others. Care is necessary under many California conditions with a tool of this type, for excessive crown rot can result from too much soil accumulating around the beet crown.

HARRY J. VENNING 82

**HARRY J. VENNING, who would have completed 20 years of service with the Spreckels Sugar Company this December, died without warning on November 18. At the time of his death Mr. Venning was the district manager in the Sacramento valley area. In the period of his employment he had earned the esteem and friendship of farmers, business associates and fellow employees alike. His passing is a loss to the company and to the many growers with whom he has worked over the last twenty years.**

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## PRE-EMERGENCE WEED CONTROL

Pre-emergence chemical weed control has long been a dream of sugar beet research people and growers alike. Events of the past few years have already made this dream a reality for some growers. Unfortunately, pre-emergence chemical weed control has its limitations.

Timing is the first consideration. The ultimate in a pre-emergence chemical would be one which is quite harmless to sugar beets, but nearly 100% lethal to all the weeds which might infest the sugar beets. Further, the material should be economical to use, have a long active life and remain immobile once placed in the proper soil depth. These requirements are very strict, but they are rapidly approaching reality.

Several chemicals are currently available which come close to meeting these requirements. The oldest (and still one of the most effective) is TCA. This material is specific only against grasses and is very soluble; hence it is easily moved by both rain and irrigation water. The material, however, is moderate in cost and with reasonable care can be used before emergence of beets.

Another material, old in name, but new in pre-emergence sugar beet weed control is endothal. This material is also reasonably priced and quite harmless to sugar beets. It has the further virtues of being lethal to a large number of both broad-leaf and grassy weed. The weed list includes pigweed and purslane as well as the common grasses —watergrass, volunteer barley and oats. Endothal in its present commercial form is very soluble and therefore easily moved by both rain and irrigation water. A less soluble form of endothal has been produced recently which is less subject to water movement. This formulation along with others, is still in the experimental stage.

*(Continued on page 48)*

# THE 1959 SUGAR BEET CROP

By G. D. MANUEL, *Vice President and General Agriculturist, Spreckels Sugar Company*

THERE IS NOW little doubt that the 1959 crop will set a record for the Spreckels Sugar Company in all of the districts in which the company operates.

It appears that the average yield in the Salinas district will approach 30 tons per acre and the Sacramento and San Joaquin Valley districts will be very close to 24 tons per acre. In addition, the sugar content in all areas is as good or better than it has been for the past three years.

## WHY SO GOOD?

There is no question that the weather during the winter and spring was ideal for sugar beets. The rains were light and there was no excess moisture to compact soils and delay the cultural operations. Because of the lack of moisture and the favorable temperatures, seedling disease conditions were minimal, very little replanting was required and stand losses subsequent to thinning were of minor importance. Abandonment was almost non-existent, compared to other years; less than 2% of the total 1959 crop plaintings failed.

Another factor related somewhat with weather, was the lack of other diseases, such as virus yellows, curly top, and leaf spot. While it is not known exactly the toll that these diseases may have taken from our present varieties, the lack of any apparent adverse condition is certainly an indication that no major crop loss resulted from these diseases. These conditions were found in scattered fields this year, but there was no general infection such as we experienced in some areas in 1957 and 1958.

A factor which probably contributed to better sugar content was the continual and rapid growth of the beets. At the high tonnages attained, better nitrogen utilization must have taken place, leaving the beet at harvest time with less available nitrogen. Nitrogen deficiencies at harvest time have a definite correlation with higher sugar content. From reports submitted by our fieldmen, we feel there has been a noticeable downward trend in nitrogen application on the 1959 crop, and at the same time, there was obviously adequate nitrogen available to produce record yields. It would therefore seem to us that nitrogen applications may still be excessive or that the carryover of nitrogen from previous crops is greater than we have suspected.

## HYBRIDS HELPED

Still another factor which we feel worth noting is that the 1959 crop had a substantial acreage planted with our new hybrid varieties. Exhaustive field tests have indicated that these hybrids yield about 15 per cent greater than former commercial varieties, so we must conclude that a significant contribution was made by these new varieties toward the record yields. Approximately 45 percent of our acreage was planted to hybrids this year. This percentage will be substantially increased with the 1960 crop.

While everyone enjoys the satisfaction of growing a record crop and the higher returns received, problems do arise in the handling of the crop that are unavoidable. Although we are processing, on the average, a larger tonnage of beets per day than ever before in the history of our company, there has not been a corresponding increase in acreage harvested due entirely to the larger yields. Individual growers observed that their harvest quotas have been much more severe than in previous years and from the standpoint of acreage harvested, this is true. However, as soon as temperatures lowered to a point where we could maintain higher inventories, piling operations were started at all three factories. Unless rains upset our planning, we should accumulate from 80,000 to 100,000 tons of piled beets during November.

## BEET TRANSPORT IMPROVED

Those of you who have been subjected to the vagaries of rail car supply in years past have probably noted the spectacular improvement in the last three years. The improved service stems from a number of innovations.

First, we have been using transport trucks to replace rail cars at every receiving station where these trucks can be effectively loaded. While these trucks have been in use for a number of years, we have never had as many operating nor used them more beneficially than this fall. At the present time we have about 94 of these trucks in use. They will conservatively replace 250 of the large cars. These cars then become available to supplement the requirements of stations where truck use is limited or impossible.

Second, working with the Southern Pacific Railroad we have altered a number of our receiving stations so the new larger, sixty-five ton car could be placed in use this fall. These cars will accommodate almost 50% more tonnage than the regular sugar beet gondolas.

Third, we have improved our communications with the railroads so that they are instantly aware of our requirements and we are as rapidly informed of their problems and shortages. By this close liaison we have been able to improve service substantially.

Even with a favorable fall harvest and the piling which we are now carrying on, it will be necessary for us to operate all of our factories during the spring campaign and we will hope to complete that harvest as rapidly as possible. Many growers have geared their operations to a spring harvest and have carried on farming practices which will assure a maximum growth of the crop through the winter months. We feel that these growers will gain substantially in income by holding these beets until spring. The records we have maintained during the past eight years when beets have been overwintered, have shown a definite gain in income to the grower. It is important to give this point particular emphasis because only with a spring campaign can we maintain maximum beet acreages in California. By maintaining the maximum acreage we have been able to keep the proportionate shares allocated to California at top level under the regulations. At the same time, marketing allotments are also kept at a maximum.

While the problems of harvest may seem paramount at the moment, it appears that record yields, good harvesting conditions and the advantages of a spring harvest place the sugar beet industry in California on a solid economic foundation. This state should, therefore, continue to lead the nation in sugar beet production.

# LIBERTY ISLAND PRODUCES OUTSTANDING SUGAR BEET CROPS

*By* WILLIAM HODSON, *Field Superintendent*
*Spreckels Sugar Company*

WITH SUGAR BEET production records toppling all over the state this year, it is difficult to single out one area worthy of special mention. But Liberty Island, located in eastern Solano County is so outstanding that it calls not only for special mention, but for a study of the reasons for its high productivity.

Liberty Island was once a part of the vast tule marsh of the upper Sacramento River Delta—a duck hunter's paradise, but by no means a farming area. In 1917 Mr. R. K. Malcolm and associates realized the agricultural potential of the region. They erected a levee system around approximately 7,000 acres and named it Victory Island. The island's present name was inspired by the last Liberty Bond Drive of World War I. Sugar beet culture began on the island in 1924.

Liberty Island is endowed with many natural assets. There are two fertile soil types on the island; Sacramento loam and Egbert muck. Summer temperatures are tempered by delta breezes and there is an adequate water supply. However, the Island's success story is primarily a combination of progressive growers and their superior farming practices.

Following is a table which outlines the Liberty Island sugar beet production for the years 1954 to 1958 inclusive, plus the estimated production for 1959:

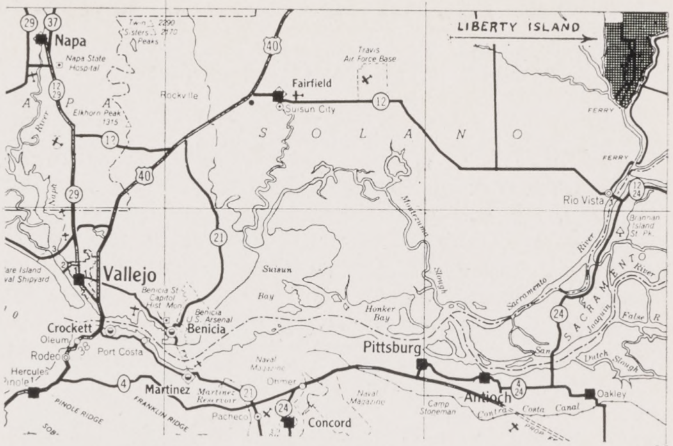
SUGAR PRODUCTION—LIBERTY ISLAND

| Year | Acres | Tonnage | Tons/Acre | % Sugar | Pounds Sugar/Acre |
|---|---|---|---|---|---|
| 1954 | 1483 | 41041.45 | 27.67 | 15.8 | 8740 |
| 1955 | 1217 | 32273.04 | 26.51 | 14.3 | 7580 |
| 1956 | 1064 | 33659.10 | 31.60 | 16.9 | 10680 |
| 1957 | 1231 | 37603.21 | 30.54 | 14.1 | 8600 |
| 1958 | 437 | 9430.39 | 21.57 | 15.6 | 6720 |
| 1959* | 1017 | 34781.95 | 34.20 | 15.7 | 10720 |

* Estimated.

It would be impossible to credit the Liberty Island success to any one factor, since the high sugar production enjoyed by the Liberty Island growers is an effect with many causes. The natural assets of adequate water, ideal temperatures and high soil fertility are certainly major factors.

Good management of these natural resources must take first place among the reasons for continued successful sugar beet production. Crop rotation, weed control and fertilizer program are in the realm of management.



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LIBERTY ISLAND is off the main roads, on the East boundary of Solano County.

Weed control on Liberty, as in any area, is a never-ending job. A network of irrigation ditches criss-cross the island and help in the dissemination of weed seeds of all types. A weedy field is not tolerated, however. Although expensive at times, weed control measures are rigidly carried out. This fact has strongly influenced yields and helped to preserve the high production standards of the island.

Fertilization rates do not vary a great deal among the Liberty Island growers. Years of sugar beet culture and individual experiments have shown that 100 to 125 pounds of N plus 50 pounds of $P_2O_5$ on the muck soils will give the greatest net return.

Excellent tenant-landowner relations coupled with long term tenancies have permitted grower and landowner to share in higher yields, for the grower is assured of his farming unit from year to year and consequently puts more time and effort into its care and upkeep.

The development and adherence to good tillage, weed control and fertilizer practices are prime reasons for their success. We all know there is no substitute for good farming practices if maximum yields are to be obtained. The Liberty Island success story is a combination that has for years produced above-average sugar beet income for grower and landowner alike.

Henry Rehrman
Fred Rehrman
Henry Shigaki
Tommy Mabalot
Toward Jarrett
Marino Romani
Guido Romani
George Struve
Harry Shigaki
Charlie Whealey

84

THESE ARE THE MEN who do such an outstanding job of growing sugar beets on Liberty Island. Toward Jarrett is Manager of Liberty Farms; not available for a photo was grower M. Anchita.

# W.B.S.P. CONSOLIDATES ACTIVITIES AT SAN FRANCISCO OFFICES

*By* HAROLD O. BELKNAP
*General Manager, Western Beet Sugar Producers, Inc.*

IT HAS BEEN observed that without change, there would be no progress. This, then, is a report of progress by Western Beet Sugar Producers, the industry's public relations organization, a report involving two major changes.

The first change is the removal of the Los Angeles regional office to San Francisco, where it will share the same address as the general headquarters office at 461 Market St. This of course meant reassigning Lee Goodman, manager of WBSP's California-Arizona-Nevada region, and "Nancy Haven," our regional home economist. For Nancy the change is in the order of a double play. When Eleanor Artuso recently resigned as "Nancy Haven" to get married, it was decided to transfer Dorothy Buhr from Denver to California. She also will operate out of San Francisco.

85

LEE GOODMAN, Manager of WBSP's California-Arizona-Nevada region, now makes his headquarters at the San Francisco office.

86

DOROTHY BUHR, from Denver, replaces newlywed Eleanor Artuso as "Nancy Haven".

The decision to move the California regional office north was not entered into lightly. Among other things, it meant a major relocation for Lee Goodman, who had spent most of his life in Los Angeles. As Lee himself was quick to agree, however, it also meant major improvements in the California operation. By every count on which we can reckon things, it will mean greater efficiency. Obviously it will mean a reduction in office expenses. And—of great importance—it will mean far closer liaison with company officials and officials of the growers' association.

Operating out of San Francisco rather than Los Angeles, then, Lee Goodman will continue to conduct beet sugar public relations activities in the California-Arizona-Nevada region, with primary emphasis on California as the state with the greatest population. The public relations goals also will remain the same—to win friends for the beet sugar industry and support of its product.

Those are the goals also, of course, of our Nancy Haven operation, but in the case of Dorothy Buhr's activities there will be not only a change of scene but a change of emphasis. Heretofore Nancy Haven has devoted the bulk of her time to demonstrations of beet sugar cookery before home economics classes, women's groups, clubs of various kinds, on radio and television, at cooking schools and so on. The warm reception Nancy Haven received from these audiences, and their enthusiastic interest in Nancy Haven beet sugar recipe materials, testify to the success of this program. In the course of the last four and a half years Nancy Haven and beet sugar have acquired thousands and thousands of friends.

Among these friends are a number of persons who have great influence in the food field—people who deal professionally with consumers on a mass basis. They include food editors of newspapers and magazines; teachers of home economics; home economists working for public utilities, government agencies, food associations and food-manufacturing companies; radio and television personalities conducting programs addressed to housewives; dieticians and nutritionists, and so on.

As the Nancy Haven program developed over the years it became increasingly clear that it was through these thought leaders that our consumer education efforts had the broadest impact. As a matter of human endurance, Nancy Haven could personally appear before only a limited number of classes or clubs or women's organizations. But, each individual home economics teacher who became a champion of beet sugar told the beet sugar story to hundreds of students in her classes. An individual food editor who had been made aware of the high quality of beet sugar and the importance of sugar beet production to our state's economy told that story to thousands of readers — consumers it would take Nancy Haven months to reach on a personal basis.

This is by no means to minimize the value of the hundreds of personal demonstrations Nancy Haven has given. Without them we could not have achieved the status we now enjoy among the state's professional home economists, food editors and so on. These people have learned to *know* Nancy Haven—and beet sugar.

It is against this background that the second major change in the WBSP operation has been made. Nancy Haven will continue to do many radio and television programs, but rather than appearing before individual groups, she will devote most of her time and energies to working with thought leaders. She will not only cultivate them and counsel with them but will also provide special beet sugar materials for them to use in their work with consumers en masse.

Nancy Haven's basic function is to strengthen the beet sugar sales effort by winning friends for the industry and its product. Effective as she already has been in achieving this end, we are convinced she will be even more effective by concentrating on selected groups of professionals whose opinions shape the tastes and buying habits of vast numbers of consumers.

# 4-H SUGAR BEET PROGRAM IN THIRD SUCCESSFUL YEAR

*By* S. L. STOVALL, *Livestock Specialist, Spreckels Sugar Company*

The third and most successful year of the 4-H Sugar Beet Program co-sponsored by Spreckels Sugar Company and the University of California's Agricultural Extension Service was happily climaxed at Manteca, where Spreckels was host to the Club members, their parents, and project leaders involved in the program.

This year some fifty-eight youngsters participated in this program, with clubs in Fresno, Stanislaus, San Joaquin, and Solano counties. This marks a considerable increase both in numbers of youngsters in the program and counties participating. Previously, these projects were limited to San Joaquin County.

Top grower in the entire project proved to be a girl—Jeannie Moe, 12, from the Crow's Landing 4-H Club of Stanislaus county, who attained a yield equal to 60.9 tons of sugar beets per acre. In terms of the final product, Jeannie's crop would produce 13,824 pounds of sugar per acre, an achievement likely to earn her the warm admiration of sugar beet growers everywhere.

Top producers in the four counties were:

Solano—Mike Cohen of the Dixon 4-H Club, 11,322 pounds of sugar per acre; and Linda Esperance, also of Dixon, 10,560 pounds.

Stanislaus—Jeannie Moe of the Crow's Landing club, 13,824 pounds of sugar; and Richard Beck of the Scenic Drivers Club, 9,128 pounds.

San Joaquin—David Murray of the Wildwood 4-H Club in Stockton, 10,144 pounds; and Gary Fisk of the New Jerusalem club, rated tops among those in the second-year projects.

Fresno—Mike Matheson, 8,379 pounds per acre; and his brother Roger, 8,149 pounds, both of Westside.

The overall 4-H sugar beet program involved two sections. One, for beginners, was held in all four counties. The other was for those who had completed the introductory project and was held only in San Joaquin county, the 4-H sugar beet project having been introduced in the other counties only this year.

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TOP BEET SUGAR producers among Stanislaus County 4-H Club members taking part in sugar beet project were Jeannie Moe and Richard Beck, shown with Farm Advisor Ros Roberts. Jeannie grew a whopping 60.9 ton-per-acre crop.

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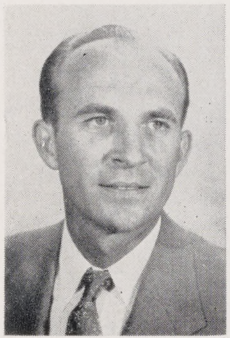
TOP BEET SUGAR producers among Solano County 4-H Club members were Linda Esperance and Mike Cohen, shown with Farm Advisor Ron Knight.

Each boy and girl participating planted a plot of sugar beets in his back yard. Plots for beginners averaged 150 square feet, those for advanced members 450 square feet.

The assignment for advanced boys and girls was more sophisticated, involving among other things a series of nitrogen applications to determine effect on growth and sugar content.

Spreckels' part in this program, in addition to acting as host for the Field Day and luncheon, has been to stimulate interest in this 4-H Club project. Several company fieldmen have contributed a great deal of their own time in assisting local club leaders in carrying on this work and supervised the growing and harvesting of the club members' beets.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Stewart Anderson

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Joe Hull

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Norman Daw

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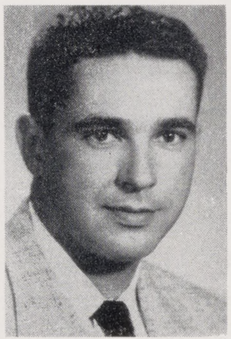
Ernie Moeller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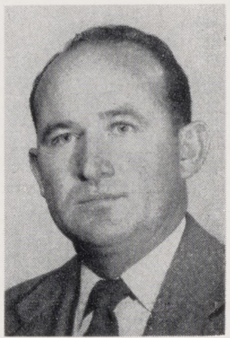
Stanley Boyer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Virgil Horton

THESE ARE the Spreckels Field Superintendents who contributed their time to assist Club members in their sugar beet projects.

## TRENDS IN WEED CONTROL

*(Continued from page 43)*

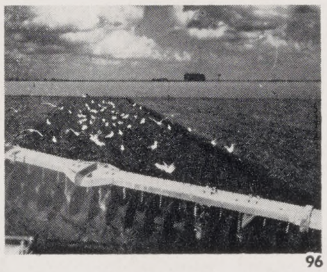
The most difficult problem in pre-emergence weed control lies in the application of materials now available or which will become available in the near future. At the present time we are dependent mainly on spraying the material on the surface of the soil after planting (depending on rainfall for incorporation), and incorporating the material as a part of the listing operation. This latter method was developed by a few growers in the Tudor area south of Yuba City. It has been very successful on single row beds and is now considered a common practice for that area.

The incorporation method has also been successful in other areas where single row beds are practiced. On double row beds, however, incorporation of chemicals has not been successful when used in connection with furrow irrigation. Further there have been several unexplained instances of failures on single row incorporation, although these instances have been conducted under questionable circumstances.

## WHAT IS THE PICTURE FOR 1960?

The rules of good farming still prevail. There are no magic methods or materials available for 1960. It thus remains for each individual, as always, to fit the following guides into his own program:

1. Wherever possible, select ground which is reasonably clean to start with.
2. Check over the mechanical aids which are available and if you intend to use them, remember that good ground preparation is essential.
3. If you have a known weed problem and are planting early with the expectation of rain for stand emergence, consider available chemicals sprayed after planting on a *limited* acreage.
4. If you plant late in spring on single rows and expect either a broad leaf or grass problem, then endothal incorporated in the bed could work to your advantage. But again try chemical weed control on a *limited* basis.
5. Always leave a few rows for a check to have a comparison of the effectiveness of the material and method of application. Chemical weed control is seldom a 100% success or failure—hence the need for a check for your own evaluation.
6. Discuss your program with your field superintendent—he has the latest information available.



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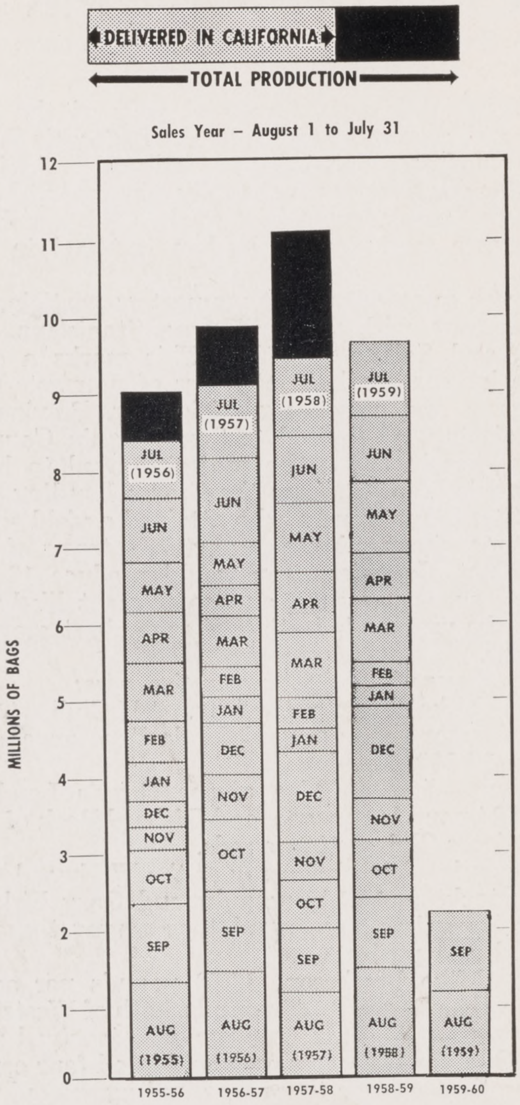
**COVER NOTE**—Disking a field before planting sugar beets is often done between storms that drive the seagulls inland for a change of diet from fish to earthworms.

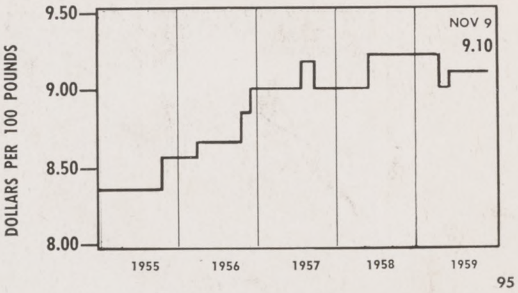
## PRODUCTION AND DELIVERIES OF BEET SUGAR IN CALIFORNIA



Sales Year – August 1 to July 31

## QUOTED PRICE OF BEET GRANULATED SUGAR

In 100 Lb. Paper Bags, F.O.B. San Francisco



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The SPRECKELS SUGAR BEET BULLETIN is issued bi-monthly by the Agricultural Department of the Spreckels Sugar Company as a service to its growers.
Mention of specific methods, devices and implements does not constitute an endorsement by the Company.
All photographs by the editor unless otherwise indicated.
AUSTIN ARMER, EDITOR SPRECKELS SUGAR COMPANY WOODLAND, CALIFORNIA

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